November · 1961

American Perfumer

HEALTH SCIENCES
NOV 30 1961
LIBRARY

Preparation and Properties of Alpha-Diketones

Evaluation of Esters of HPC as Emulsifying Agents

Colloidal Solutions of Lanolin in Oils

Physiological and Biochemical Changes of the Aging Skin

NORDA MAKES GOOD SCENTS

Norda®

Exclusive Basic Materials for: Perfumes, Cosmetics, Colognes, Soaps

Write on your letterhead for free samples:

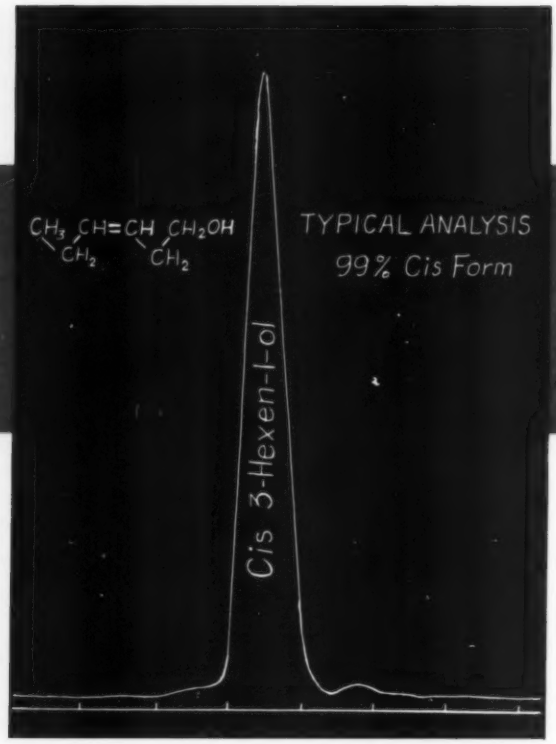
NORDA, 601 W. 26 St., New York 1, N.Y. • Chicago • Los Angeles • San Francisco • Toronto • Montreal • Havana • London • Paris • Grasse • Mexico City

TRACKING THE UNKNOWN CONSTITUENTS

Paper and film chromatography are among the modern methods used in trace analysis. The evaluation of a chromatogram by an experienced analyst enables him to reach conclusions as to the constituents and the purity of an unknown mixture. Nature provides the biggest challenge. This is just another tool in the hands of our Research Teams.

DRAGOCO INC.
KING ROAD · TOTOWA · N. J.

New Jersey Telephone: CLifford 6-3850
New York Telephone: CHickering 4-8235



LEAF ALCOHOL

Now available, this unique alcohol of extreme purity, occurring widely in numerous plants, fruits and vegetables, and possessing the characteristic odor of freshly-cut foliage. Use traces of this leaf alcohol in your fine perfume and flavor formulations to achieve an ideal naturalness.

COMPAGNIE PARENTO INC.

CROTON-ON-HUDSON, NEW YORK

New York Office: 507 Fifth Avenue, Phone: MUrray Hill 7-5133

Compagnie Parento, Ltd. • 73 Adelaide Street West, Toronto 1, Ontario, Canada

ESSENTIAL OILS
AROMATIC CHEMICALS

PERFUME BASES
FINE FLAVORS

American Perfumer

VOL. 76, NO. 11 November, 1961

Contents

Contenu
Contenido
Inhalt

Preparation and Properties of Alpha-Diketones
.....by Dr. Kurt Kulka 23

Selected diketones, if properly and chemically balanced, will give unexpected effects in many perfume and flavor compounds.

Préparation et propriétés de l'Alpha-Diketones.

Les choix des Diketones, s'ils sont bien chimiquement équilibrés, fourniront des effets inattendus sur de nombreux parfums et sur des composés parfumés.

Preparación y Propiedades de los "Alpha-Diketons"

Ciertos "diketones", si han sido propia y químicamente balanceados, producirán efectos inesperados en muchas mezclas para perfumes y sabores.

Herstellung und Eigenschaften von Alpha-Diketonen

Wenn ausgewählte Diketone richtig und chemisch ausgeglichen sind, ergeben sie unerwartete Wirkungen in vielen Parfum- und Geschmacksverbindungen.

Evaluation of Esters of HPC as Emulsifying Agents
.....by S. C. R. Chokhavatia and J. Autian 30

A new series of surface active agents has been synthesized from sucrose having a range or hydrophile-lipophile balance values. Evaluation tests show that excellent emulsions can be achieved with certain oils.

Evaluation de l'éther dans le HPC en tant qu'agent émulsionnant

De nouvelles séries sur la surface des agents actifs ont été synthétisées avec du saccharose qui varie suivant la balance de l'hydrophile-lipophile. Les essais d'évaluation montrent que d'excellentes émulsions peuvent être obtenues avec certaines huiles.

Avaluación de los Esteres de HPC Como Agentes Emulsivos

Una nueva serie de agentes activos superficiales ha sido sintetizada de la sucrosa, teniendo una variación de valores con balance hidrófilo-lipófilo. Las pruebas de avaluación muestran que se pueden lograr emulsiones excelentes con ciertos aceites.

Bewertung von HPC Estern als emulsionierendes Mittel

Aus Sukrose wurde eine neu Reihe Mittel mit Oberflächen-Effekt synthetisch hergestelt, die einen Bereich von Hydrophil-Lipophil Ausgleichs-Werten aufweisen. Bewertungsversuche haben gezeigt, dass ausgezeichnete Emulsionen mit gewissen Olen gewonnen werden können.

Colloidal Solutions of Lanolin in Oils....by Rachel Heald 37

Various compositions are given as well as formulation methods and historic background.

Solutions colloidales du Lanolin dans des huiles

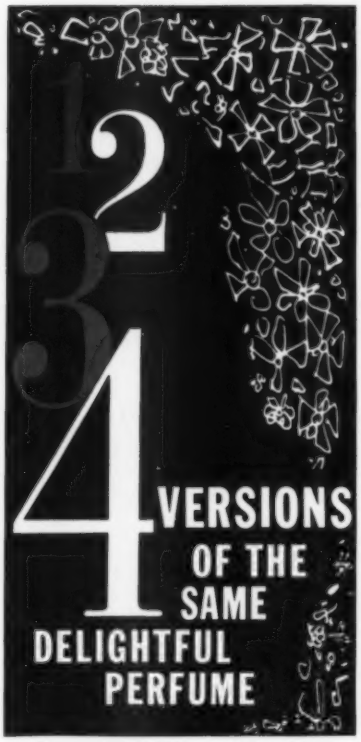
Plusieurs compositions y sont fournies ainsi que leurs formules et leurs origines.

Soluciones Coloides de Lanolina en Aceites

Se describen varias composiciones y métodos de formulación y antecedentes históricos.

Kolloide Lösungen von Lanolin in Olen

Verschiedene Zusammensetzungen werden angeführt, sowie Formulierungs-Methoden und der geschichtliche Hintergrund.



Compounded and priced for a complete line of fragrance preparations

1 FLEURTONE A. P.
For liquid and pressurized perfume and eau de toilette. $23.00 per pound

2 GLORINE A. P.
For cologne, bath oil and sachet. $9.50 per pound

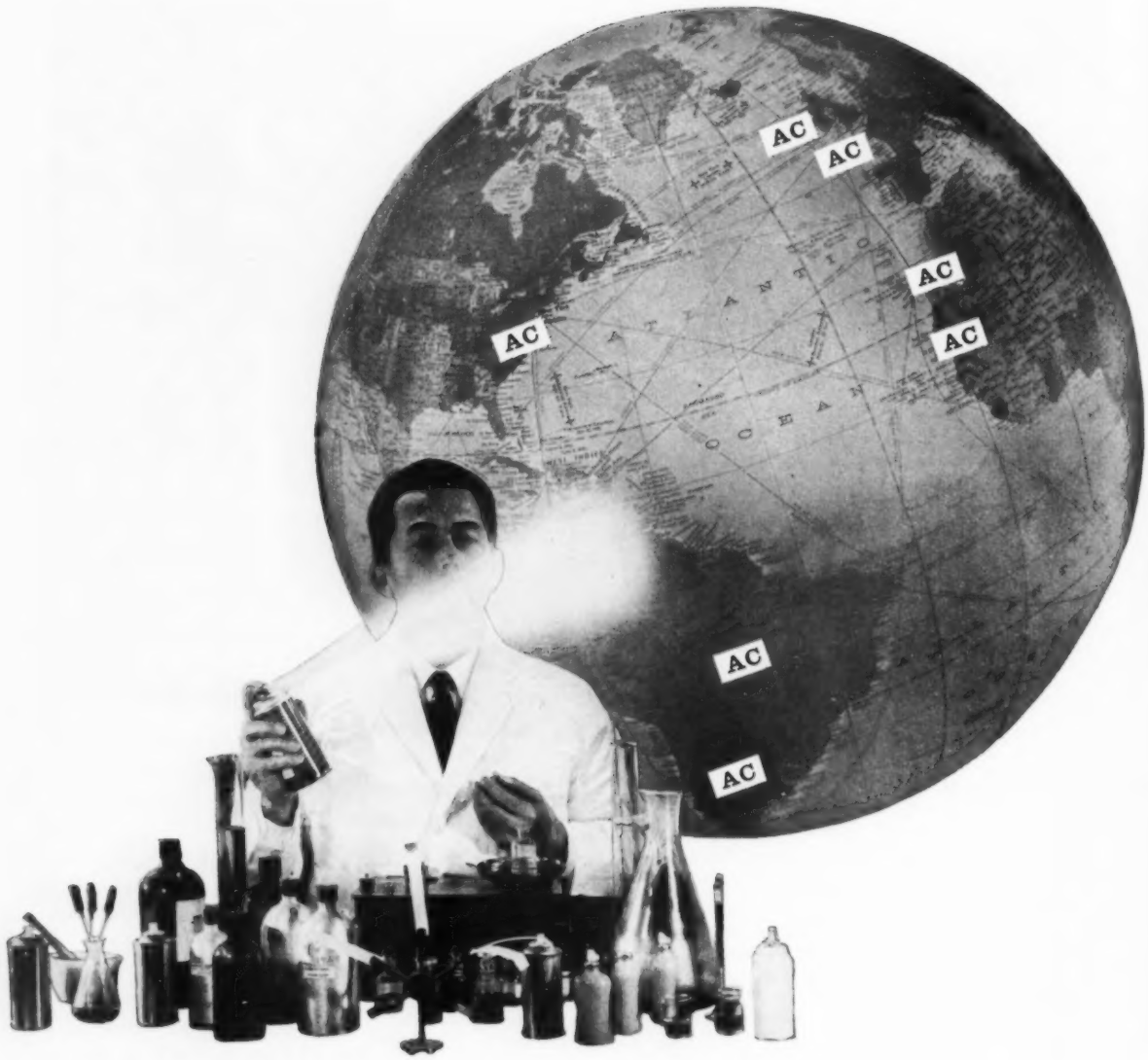
3 FLEURSCENT A. P.
For creams, powders, hair sprays. $5.00 per pound

4 GLORALIA A. P.
For shampoos, bath preparations, soaps. $3.75 per pound

Each of these 4 compounds gives your product a fresh, appealing floral bouquet at the lowest cost possible. Why not write today for full information or order a trial quantity for your own tests.

AROMATIC PRODUCTS
Incorporated
235 Fourth Avenue, New York 3

CHICAGO · DALLAS · MEMPHIS · PITTSBURGH · LOS ANGELES · BOSTON



Since 1768 the House of Chiris has dedicated itself to the Fifth Sense (Olfactive). In the development of Essential Oils, Floral Absolutes, Chemical Isolates, Synthetic Chemicals, and all those creations and specialties which combine industrial aromatics with natural products and produce fragrance, the House of Chiris has a cherished history. Today Chiris maintains laboratories headed by experienced chemists who have available to them not only the accumulated knowledge of generations of Chiris perfumers and chemists, but also the research facilities of six modern laboratories located in **Grasse and Paris, London, Sao Paulo (Brazil), Buenos Aires (Argentina), and New York City.** Whether Essential Oils, Isolates, or combinations thereof, are used as fragrance constituents by the perfumery, soap, cosmetics or allied industries, we are happy to be consulted.

ANTOINE CHIRIS CO., INC. 220 East 23 Street, New York 10, N. Y.

MANUFACTURING LABORATORIES
GRASSE • PARIS • LONDON • SAO PAULO • BUENOS AIRES
REPRESENTATIVES WORLD-WIDE

Improvements in or Relating to the Stabilization of Hydrogen Peroxide 39

Traces of impurities have a catalytic action on the decomposition of hydrogen peroxide. The decomposition is exothermic and accelerates the decomposition reaction. Stabilizing method is explained.

Améliorations se rapportant à la stabilisation de l'eau oxygénée.
Les traces d'impurités ont une action catalytique sur la décomposition de l'eau oxygénée. La décomposition est exothermique, et elle accélère sa réaction. Une méthode de stabilisation y est expliquée.

Mejoras en o en Relación a la Estabilización del Peróxido de Hidrógeno
Los vestigios de impurezas ejercen una acción catalítica sobre la decomposición del peróxido de higrógeno. La descomposición es exotérmica y acelera la reacción corruptora. Se explica el método de estabilización.

Verbesserungen bezüglich der Stabilisierung von Wasserstoff-Superoxyd
Die geringsten Verunreinigungen habe eine katalytische Wirkung auf die Zersetzung von Wasserstoff-Superoxyd. Die Zersetzung ist exothermisch und beschleunigt die Zersetzungs-Reaktion. Die Stabilisierungs-Methode wird erklärt.

The Problem of Communication ..... ***by Warren Shultz*** 41

Author calls for clearer technical writing than is currently in vogue, and proposes corrective measures to bring clarity into reports and other technical material.

Le problème de communication
L'Auteur demande à ce que les écrits techniques présentés à l'Heure actuelle soient plus compréhensibles et il suggère certaines corrections afin d'éclaircir les rapports et les autres écrits techniques.

El Problema de la Comunicación
El autor propone escritos técnicos más claros de los que están en boga, y expone medidas correctivas para prestar claridad a los informes y demás material técnico.

Das Problem der Berichterstattung
Der Author fordert grössere Klarheit in technischen Berichten als gegenwärtig üblich ist und schlägt Verbesserungsmassnahmen vor, um Berichte und anderes technisches Material leichter verständlich zu machen.

Physiological and Biochemical Changes of the Aging Skin ..... ***by Irwin I. Lubowe*** 44

Various changes are noted and the author discusses numerous research studies that are being conducted to get an understanding of the cause of skin changes.

Changements physiologiques et biochimiques des peaux vieillissantes.
De nombreux changements sont remarqués, et l'auteur parle de plusieurs études faites afin de comprendre la cause due aux changements de la peau.

Cambios Fisiológicos y Bioquímicos en el Envejecimiento de la Piel
Se señalan varios cambios y el autor hace referencia a numerosos estudios de investigación que se están realizando con el objeto de comprender mejor la causa de los cambios en la piel.

Physiologische und biologische Veränderungen der alternden Haut
Verschiedene Veränderungen werden angeführt; der Author bespricht zahlreiche Forschungs-Untersuchungen, die zum Verständnis der Ursachen der Hautveränderungen unternommen wurden.

Fragrant Flowers and Leaves — Part II, The Acanthaceae ..... ***by Edward S. Maurer*** 47

The Bear's-foot Family, is an interesting selection of herbaceous plants (trailers, climbers, shrubs and trees).

Fleurs et Feuilles Parfumées–Partie II, L'Acanthe
La famille des pieds-de-Griffon représente une sélection intéressante de plantes herbacées.

Flores y hojas fragantes–Parte II, La Acantácea
La familia del "Eléboro Negro" es una selección interesante de plantas herbáceas.

Duftende Blumen und Blätter–Teil II, Die Akanthus-Familie
Die Bärenklau-Familie bietet eine interessante Auswahl krautartiger Pflanzen.

DEPARTMENTS

Desiderata 19
Reactions 8
Technical Abstracts 50
News and Events 61
News of the Societies 57
News of the American Society of Perfumers 58
New Products 65
Classified Advertising 66
Industry Events 66
Professional Services 67
Index to Advertisers 68

Executive Offices
418 North Austin Blvd.
Oak Park, Illinois
VIllage 8-6310

Eastern Office
358 Fifth Avenue
New York 1, New York
LOngacre 3-4382

P. W. Allured
Publisher

Stanley E. Allured
Assistant Publisher

M. G. deNavarre
Editorial Director

David A. Glenn
Managing Editor

John H. Muller
Eastern Manager

J. W. Allured
Business Manager

Mary Aslesen
Circulation Director

Janet Northrop
Advertising Production Mgr.

Published Monthly by Allured Publishing Corporation. Office of Publication: Pontiac, Illinois. **Editorial and executive offices:** 418 North Austin Boulevard. Oak Park, Illinois. P. W. Allured, President. Subscription Rates U.S.A., Possessions and Canada, $5 one year; $1.00 per copy. Other countries $15 one year. Allured Publishing Corporation is also publisher of The Manufacturing Confectioner. Copyright 1961. Second class postage paid at Pontiac, Illinois.

Yaminal

PURE AMYL CINNAMIC ALDEHYDE

The remarkable improvements that extreme purity confers upon the odours of aromatic chemicals are strikingly illustrated in YAMINAL. Heretofore, the jasmin-like odour of amyl cinnamic aldehyde has only been perceived, marred and debased, through a screen of unpleasantly fatty by-odours.

Now, for the first time, this screen has been lifted and we are offering YAMINAL—a synthetic of such purity and sweet, flowery fragrance that it cannot fail to become the ideal complement to the costly Jasmine Absolute.

A uniform chemical body, stabilised by the addition of 0.02% diphenylamine, YAMINAL will solve many of the perfumer's formulation problems.

No compounding room is complete without YAMINAL— the perfect amyl cinnamic aldehyde.

ONE OF THE ABRAC PURE PERFUMERY CHEMICALS

ABRAC

A. BOAKE, ROBERTS & CO. LTD., STRATFORD, LONDON, ENGLAND *Member of the Albright & Wilson Group of Companies*

Agents for U.S.A. COMPAGNIE PARENTO INC., CROTON-ON-HUDSON, NEW YORK.

New York Office: 507 FIFTH AVENUE. Phone: MURRAY HILL 7-5133

DTV/164

By action of its board of directors, the American Society of Perfumers has affirmed its intention to work with this magazine, AMERICAN PERFUMER. The purpose of this step is to bring greater international recognition to the work of American perfumers generally, and focus attention on the important work of the Society in particular.

The immediate practical effect of this step will be the first publication of the papers presented before the Society in this magazine. These papers will be identified, in addition to the

usual credit line, with this floral spray, a symbol of the Society. In addition, papers will be published from time to time which are not presented before the Society, but which have been reviewed by the Publications Committee of the Society.

Mr. William Lambert

In order to facilitate the exchange of information between the Society and the editorial staff of the AMERICAN PERFUMER, we have retained Mr. William Lambert to act in a liaison capacity. It is our firm conviction that there is no one more fitted for this position, by virtue of both knowledge and experience.

We are looking forward to working more closely with the Society and its officers and members. As the perfumer faces more and more demanding specifications for his creations, so he is forced toward a more scientific approach to his work. The result is a blending of artistic and scientific talents and abilities that is rare in industry.

That this blend of talents is being successfully achieved is attested to by the growing volumes of scientific literature on perfumery, and the world-wide recognition of the vital and unique contribution the perfumers of the United States are making to this science.

It is our intention that the pages of AMERICAN PERFUMER shall continue to record the development of both the art and science of perfumery.

REACTIONS

Hydroquinone in bleaching cream

I noticed in a recent issue that you state you are not aware of hydroquinone itself being used as an ingredient in bleaching cream. There are two skin creams that are packaged in metal tubes, namely Artra and Skintona which contain the statement on them that their creams contain hydroquinone as an ingredient. The Artra formula also states that there is a patent on the use of this chemical in such a product. Is it possible that these two products contain butyl hydroquinone or other quinones and do you believe these are safer from a dermatological standpoint than the hydroquinone itself?—L. S. H., Illinois.

We are not acquainted with Skintona, but if the Artra product is the one formerly called Sutra, to our knowledge it is covered by U. S. patents 2,376,795 and 2,377-188 which use ascorbic acid, as we remember, to neutralize any undesirable affect of hydroquinone. The Sutra product, however, is used as a sun screen and to our knowledge does not contain any butyl hydroquinone.

Wants high grade perfumes

We are very much interested in a source of supply for high grade perfumes, such as "White Shoulders" which is evidently made in the United States as we cannot find this brand in Paris.— H. A., Italy.

The various advertisers of perfume compounds in the AMERICAN PERFUMER *are able to supply fragrances simulating any of the popular odors. None will be exactly the same, which is indeed better. We suggest you write these companies.*

Preparing perfumery compounds

Can you assist me in preparing perfumery compounds such as rose, jasmine, fogur, etc? If you have some literature on these I would appreciate receiving it. Would you also suggest a formula for preparing face powder?—K. P., Pakistan.

A formula for face powder which should find ready acceptance in your country might start with zinc oxide 20%, finest talc 65%, Zinc stearate 5% and light precipitated chalk 10%. If the hiding power is insufficient, this may be augmented by increasing the amount of zinc oxide or by adding one or two per cent of titanium dioxide. Generally, it takes about one per cent of perfume for face powder to do a satisfactory job.

As to formulating perfume compounds, this is no job for beginners. Expert perfumers have their own problems and part of this was discussed in the "Perfume Documentary" published in the AMERICAN PERFUMER, *June 1960. If you plan to go into the perfumery business, you should get a copy of this issue.*

You should also get one of the several books on perfumery which are available in English. One of the old standard texts is the work by Poucher entitled "Perfumes, Cosmetics and Soaps," which has become available in a new edition of three volumes, through the book department of the AMERICAN PERFUMER.

Formula for dandruff treatment

We are interested in marketing a dandruff-treatment shampoo. Any information as to active ingredient or recommended formula would be appreciated. Can you supply us with the name of the manufacturer of the following product? It is 2,6-Dimethyl-4-Hydroxchlorobenzene.—H. J. H., Maine

We regret that we know nothing about 2,6-Dimethyl-4-Hydroxchlorobenzene. However, we do know that p-chlorometaxylenol *is used as a germicide in dandruff shampoos. We are sending you a supplier's name by letter.*

Erratum

In the September issue, confusion seems to be heaped upon confusion in the article: Present Status of Hydrophile-lipophile Balance by Paul Becher. To conform with the material in the text, Figure 7 should be numbered Figure 5, Figure 5 numbered Figure 6, and Figure 6 numbered Figure 7. The captions accompanying each of the figures are correct, merely the numbers are confused.

ASK US

if you want a new scent with Sophisticated Elegance

SYNAROME
CORPORATION of AMERICA

Telephone
GR. 7-6313

24 East 21st St.
New York 10, N. Y.

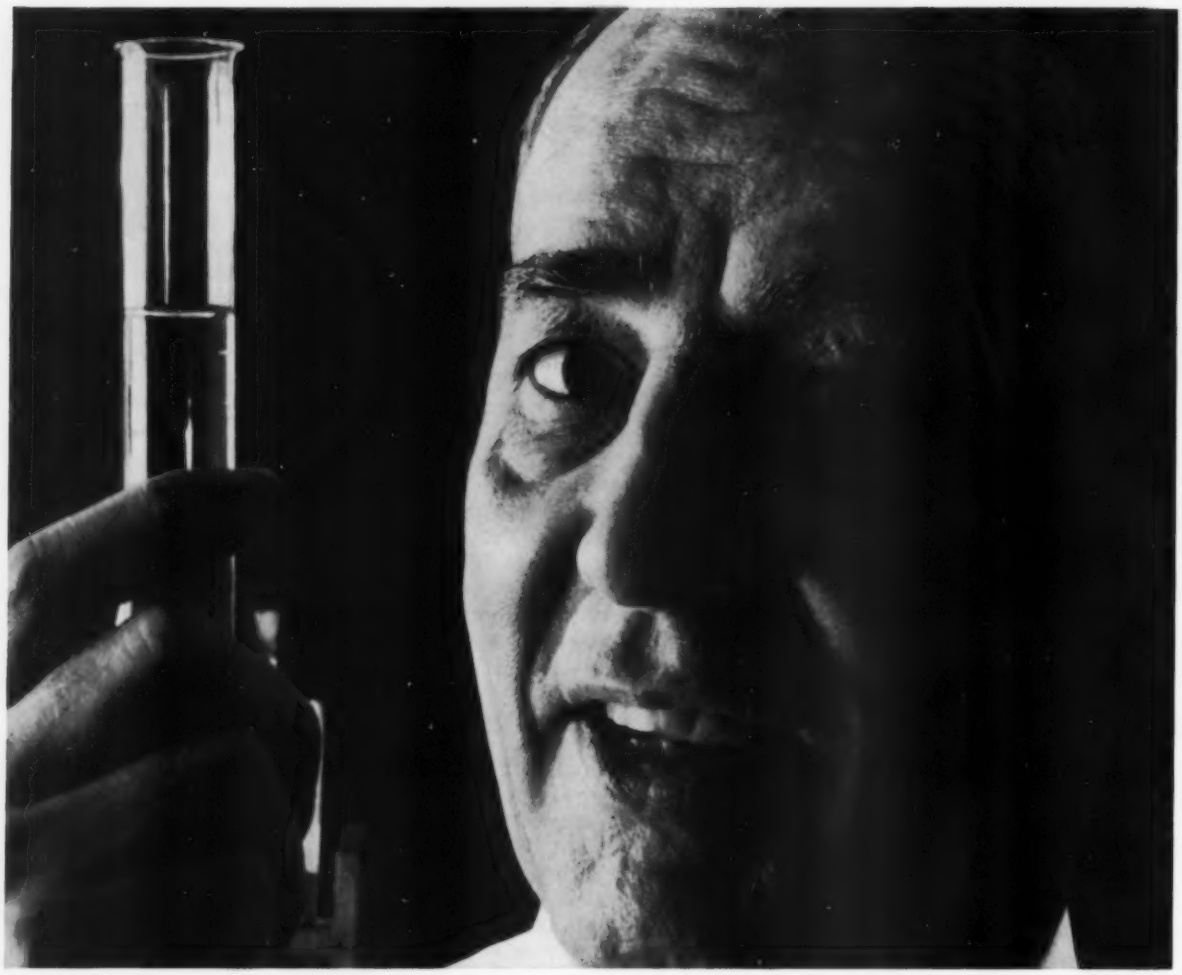
Division of
AMERICAN AROMATICS, INC.

Masters in the Art of Creative Perfumery

FLEUROMA

NEW YORK CHICAGO PARIS LONDON SAO PAULO

This anti-perspirant chemical has a pH like the skin



To get the right basic ingredient for your anti-perspirants, get Reheis CHLORHYDROL®. No buffering is needed with this basic ingredient. Its pH (ranging from 4.0 to 4.2) closely approximates the lower range of the normal pH of the skin, and also makes it much less destructive to fabrics.

CHLORHYDROL is much less acid than other active ingredients and has a higher aluminum content, so is much less destructive to perfuming agents. It can be used with a wide variety of perfumes.

There are *five* different forms to suit the exact needs of your cream, lotion, spray or powder formulas: granular, fine, medium, impalpable and 50% w/w solution, *in any quantity from stock.*

For stick deodorants, there is CHLORACEL®, a 40% w/w solution or powder. It's wise to come to Reheis first for anti-perspirant supplies or technical help.

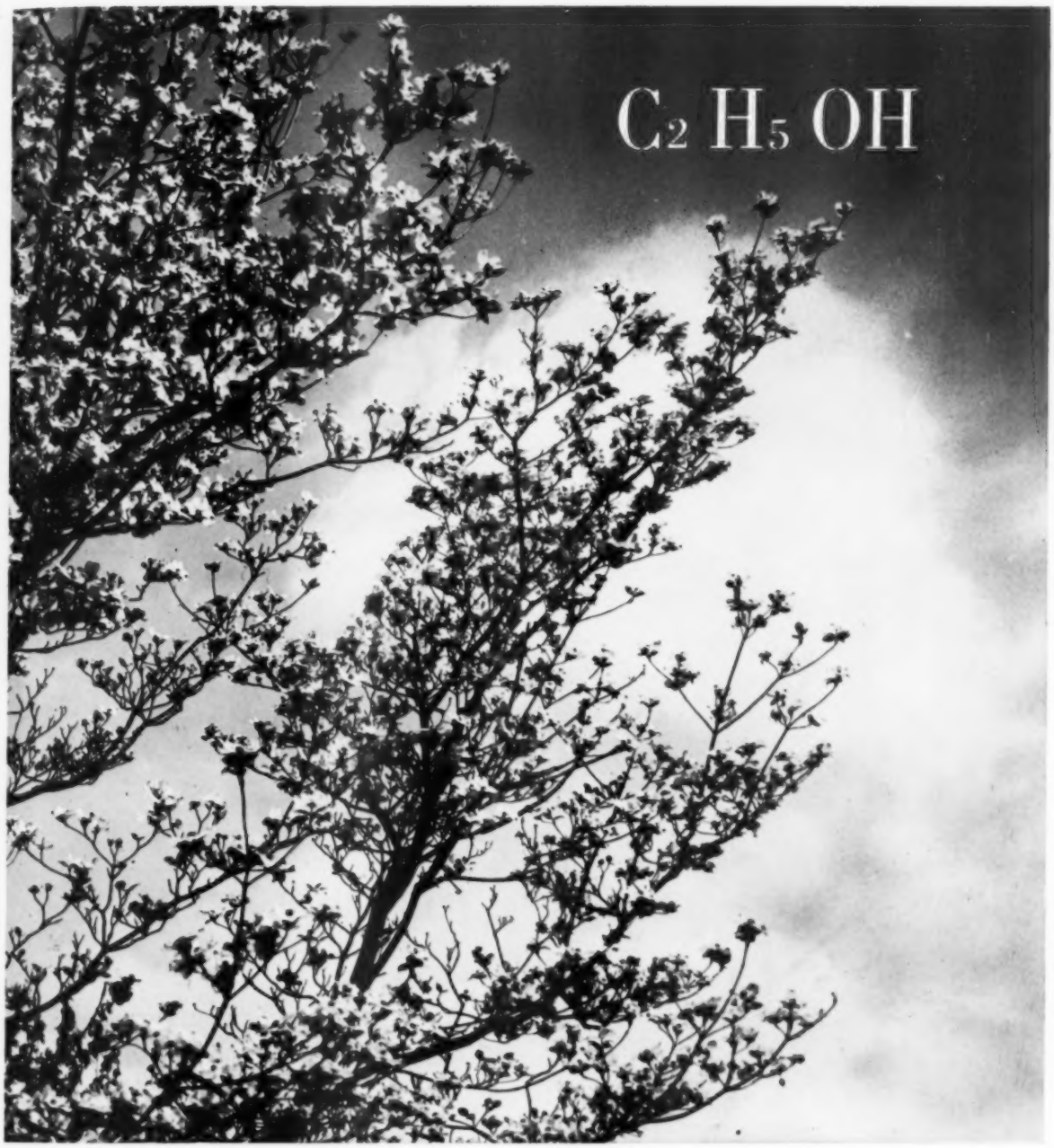
Manufacturers of fine chemicals and biologicals

REHEIS COMPANY, INC.

Main Office, Research Laboratories and Plant
Berkeley Heights, New Jersey

Other plants:
Stamford, Connecticut • Passo Fundo, Brazil • Montevideo, Uruguay

4225



You can depend on Publicker for purity

. . . a dependable source of pure "neutral-scent" ethyl alcohol for the cosmetic, perfume and pharmaceutical industries.

Publicker

INDUSTRIES INC.
1429 Walnut Street, Philadelphia 2, Pa.

Philadelphia—LOcust 4-1400 • New York—OXford 5-4160
Boston—HOmestead 9-0022 • Chicago—RAndolph 6-1557 • St. Louis—PRospect 6-0858 • New Orleans—FIllmore 7-1486 • Los Angeles—HUbbard 3-6430

Nothing persuades like the fragrance impulse

Throughout the mist of ages and the span of time, the fragrance impulse has always influenced human beings. What timeless thoughts, what emotions are contained in a purposed scent! For the fragrance impulse persuades like a soundless language... speaks powerfully to our senses and moves us to action. How often the fragrance impulse, alone, tells which soap, what lotion, what spray our reaching hand should choose. Yet to create the fragrance impulse is an art.

At Givaudan it is a combination of unrivaled knowledge with tremendous resources in perfume chemistry... and an imaginative understanding of the changing desires of human beings. If you would like the fragrance impulse to work for you, come to Givaudan, where creativity comes first. No one in the world has done so much to add to the meaning of things through fragrance.

Givaudan-Delawanna Inc., 321 West 44th St., New York 36, N.Y.

GIVAUDAN

Copyright 1960 by Givaudan-Delawanna Inc.

. . . a well rounded Line of raw materials for the cosmetic field

Van Dyk & Company, Inc.

BELLEVILLE 9, NEW JERSEY

NEW YORK CHICAGO LOS ANGELES TORONTO MONTREAL

Isobutyl Linalool
for sweetness —

Isobutyl Linalool, a new patented homolog of Linalool. Not to be confused with Linalyl Isobutyrate. Gives natural sweetness to any compound. Particularly suitable for light florals. Stable: does not discolor. Available through principal essential oil dealers.

Aromatics Division
HOFFMANN-LA ROCHE INC · NUTLEY 10 · N.J.
NOrth 7-5000 · N.Y.C. - OXford 5-1400

Also new—
Isobutyl Heptenone

fruity,

powerful

ketone

* * *

stable -

does not

discolor

Aromatics Division

HOFFMANN-LA ROCHE INC · NUTLEY 10 · N. J.

NOrth 7-5000 · N. Y. C. - OXford 5-1400

Frescoes fragment of the Thracian Tomb 4 B.C. near Kazanlik, THE VALLEY OF ROSES

CENTURIES LONG TRADITION AND EXPERIENCE

CHIMIMPORT
Direction 'Bulgarska Rosa'

BULGARIAN OTTO OF ROSES

guaranteed pure and genuine
CONCRETE OF ROSES • ABSOLUTE OF ROSES
PEPPERMINT OIL 'Bulgaro-Mitcham'
LAVENDER OIL • ZDRAVETZ OIL, etc.

The only manufacturers and exporters
2, Stefan Karadja Street, Sofia, BULGARIA
Telegrams: Rosaexport; Telex: Sofia 522

Vive la différence!

Have your laboratory add
a touch of natural flower oils
to your fragrance composition
and smell the difference.
The added warmth and depth will
always be there–right
down to the end of the container when
Milady is ready to purchase again.

Charabot
natural
flower oils

Sole distributors in the U. S. and Canada for CHARABOT & CIE., successors to HUGUES AINE, Grasse, France

CHARABOT & CO INC.

114 East 25th Street, New York 10, N. Y. • ORegon 4-0510

DESIDERATA

Maison G. deNavarre, M.S., F.A.I.C.

Notes

Thiodiglycollic acid is reported to have anticancerogenic properties according to Sahasrabudhe and coworkers (Nature *191*, 388, 1961) . . . . . The downward trend of fats and oils used in making soaps was arrested in 1960. However, the amount used was only about a half of that used in 1940 or 1950.

The latest from London is PFWONG. This is the name chosen by a youngster to express his personality to the world, a word which comes from the unconscious and is therefore, sacred. Then there is Fox and Doodles, not to forget Pooh . . . . . Speaking of London, the *Daily Telegraph* reports on the CIDESCO meeting in Athens. It seems like the exotic gets more so each year. Now it is caviar in creams to remove wrinkles, also the apple from Sodom and the water from Um Boghek near the Dead Sea.

Work done by Wurster and Dempski (J. Am. Pharm. Assoc. Sci. Ed., *50*, 588, 1961) indicates that the "relative penetration rates for test penetrants in keratin tissue are in the following order: oleyl alcohol —cholesteryl acetate>oleic acid> cholesteryl oleate>linolenic acid> linoleic acid." . . . . . Although A. Boake Roberts and Co. of London are now offering isopropyl linoleate, it is interesting to recall that Van Dyk and Co. have had it available for many years.

Looks like the brush type of large hair roller, used by gals to set their hair at night before retiring, may be the cause of bald spots and hair loss in young women according to M. J. Kipnik . . . . . When tested in emulsified form as a bath, mineral oil is absorbed more readily than cottonseed oil, the ratio being 1.29 to 0.80. This indicates usefulness for mineral oil emulsions, or self-emulsifying mineral oils in bath preparations.

In the May issue I mentioned that George Kolar birdied out in Palm Springs. Not being a golfer, I didn't know the difference between a hole in one and a birdie. George had a hole in one—and thanks to the dozen people who corrected me . . . . . Congratulations to Fritzsche Brothers and Prof. E. R. H. Jones of Oxford University, who won the firm's award. Prof. Jones's award was based on his work on terpenes.

Bath products

Some may have seen the bath product from Germany that contains extract of horse chestnut, the various vitamins, minerals and other goodies. It is available in the U.S.A. under a slightly different name, and the label statements are somewhat modified.

Now a German raw material supplier offers three different extracts, (a) for sedative baths, (b) for vitamin baths and (c) for herbal baths.

You can boost the usefulness of these materials by use of an appropriate surfactant mixture to help solubilize these valuable agents, at the same time play around with a few bubbles and let the bath drain down so no bath tub ring is left behind.

In Germany, many of the better hotels have a sample of a vitamized bath product in your bathroom for trial. Of course, here we use more showers so some of the value of the idea is lost.

It is said that homeopathic amounts of the biocomplexes are so introduced into the bath and thus produce their effect—along with the hot water.

Modified Keratin

A powdered, partially hydrolyzed, water insoluble keratin is available from a new source. The material immediately suggests itself in certain skin and hair preparations when solubilized at a pH around 8.5 to 9.0. But an unusual property of the presently described keratin is its affinity for oil. The light tan colored powder will take oil out of water mixtures or emulsions. It can be used in enteric coating of tablets for example. With a sulphur content of 3% and 15% nitrogen, this new material promises to be useful in a variety of applications.

Alcohol dermatitis

Work reported by Drevets and Seebohm indicates that the lower aliphatic alcohols as a group, are allergenic. Methyl alcohol showed +++; ethyl alcohol from + to ++++ depending on concentration; isopropyl alcohol +++, butyl alcohol ++ and amyl alcohol ++ reactions by patch testing two patients with this allergy. Maximum reaction for ethyl and isopropyl alcohols came at 70% concentration. In the case of ethyl alcohol, a 35% concentration gave +++ reaction.

Book Reviews

Physical Pharmacy by Alfred N. Martin, 692 pages, indexed and illustrated. Lea & Febiger, Phila. 6, Penna., 1960, Price $15.00.

This book was conceived in anticipation of the new five year undergraduate course in colleges of pharmacy. The author combines the theory and science of pharmacy for these students. In a few words, this book deals with physical chemistry as it applies to pharmacy. To understand the book, the reader will have to have a good background in algebra and mathematics.

In 20 chapters, subjects as diverse as the following are discussed: structure of matter, solutions, electrolytes, ionic equilibria, buffered solutions, oxidation-reduction, solubility, complexes, rate process, colloids, interfacial phenomena, rheology and micrometrics. The 168 illustrations and 108 tables go far to explain the text.

While the book is intended for the undergraduate, it appears to this reviewer that the student will have had to be in his third or fourth year of pharmacy to fully comprehend the text. Having understood it and satisfactorily passed the course, such a student would make an excellent cosmetic chemist.

It is a good review for those who have been out of school a while. Everything is under one cover. (M.G.deN.)

Merck Index, Seventh Edition, 1641 pages, Merck and Company, Inc., Rahway, N. J., 1960, Price $12.00

This tremendously valuable book has at last been brought up to date in the present edition. There are almost 500 more pages and a similar proportionate increase in the number of entries.

But a serious mistake has been made in placing the page lead titles at the top next to the binding rather than on the right hand top of the page. One can no longer easily thumb through for a reference as has been possible in earlier editions.

There is a cross-index of almost 300 pages which material could be more useful if it appeared in alphabetical position in the main text.

As is the case with any book of this type there are inconsistencies in listings. Thus, Acetulan Modulan and Lanocerin are listed but Lantrol, Hartolan and Fluilan are not given.

Purists may find fault in some of the nomenclature but there is much in favor of common usage. This reviewer is in favor of the latter. This is not a book on chemistry.

All in all, this is one of the best if not the best book values in print. It is an indispensable laboratory reference and highly recommended. (M. G. deN.)

GCC

TEGACID® regular

THE ESTER-BALANCED SELF-EMULSIFYING GLYCERYL MONOSTEARATE FOR SYSTEMS CONTAINING ACIDIC OR CATIONIC AGENTS

IN COSMETICS • PHARMACEUTICALS . . .

High performance at low pH *plus* compatibility with cationic agents establish **TEGACID** regular as *the* emulsifier for

- Antiperspirant-deodorant creams and lotions
- Cream hair rinses of low pH values
- Dermatological creams and lotions adjusted for normal acidity of healthy skin
- Topical Pharmaceuticals containing cationic antibiotics like neomycin and polymyxin; quaternary germicides; acidic or acid-solubilized medicaments; astringents; etc.
- Gynecological creams and jellies

TEGACID yields stable emulsions having prime texture, spreadability and cosmetic elegance—spanning the viscosity range from thin lotions to heavy creams and gels.

Write for data and samples.

Other Goldschmidt ester-balanced emulsifiers

TEGIN — self-emulsifying glyceryl monostearate for neutral emulsions.

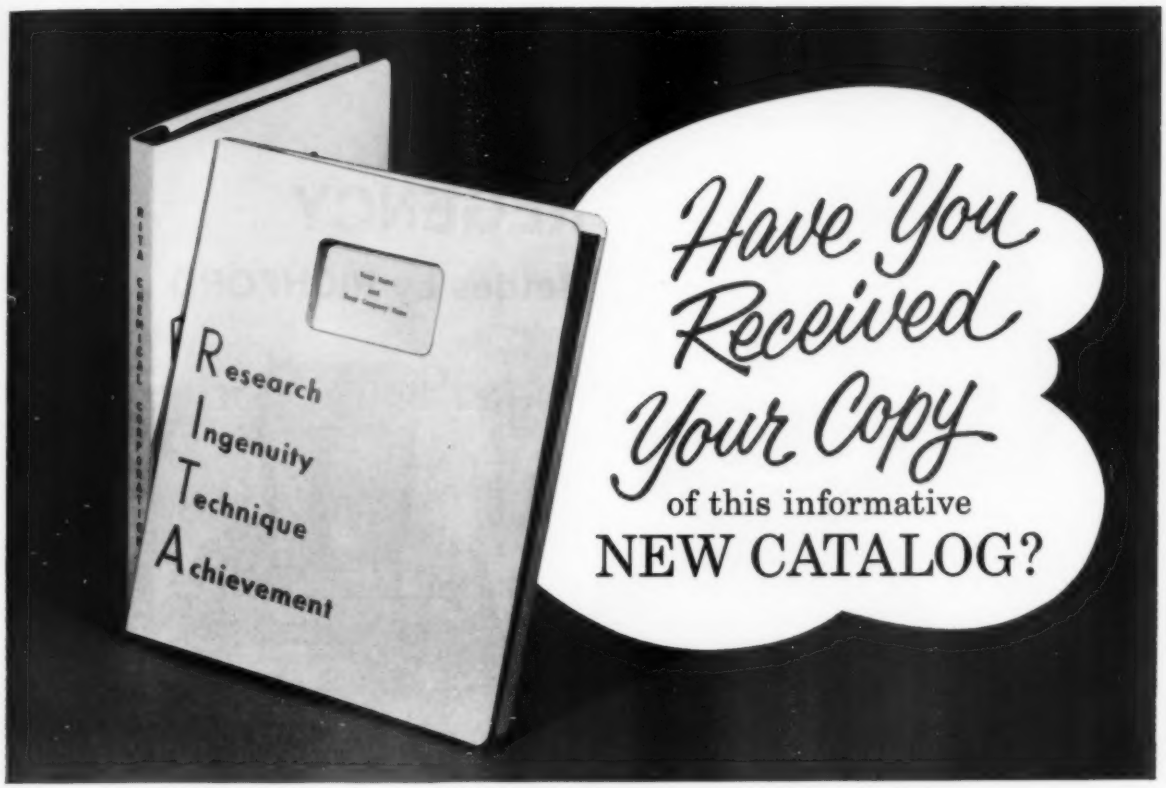
TEGIN P —self-emulsifying propylene glycol monostearate.

TEGIN 515 — non-self-emulsifying glyceryl monostearate for use with auxiliary emulsifiers.

TEGACID SPECIAL —self-emulsifying glyceryl monostearate, stable with acids and anionic agents.

Goldschmidt Chemical Corporation

153 Waverly Place • New York 14, N. Y. • CHelsea 3-4792



Each page plastic covered. Lock-latch binders for easy removal and additions.
Additional inserts will be sent as new data or new products are developed.

Contents ■ **LANOLINS U.S.P.**

■ **LANOLIN DERIVATIVES**

Characteristics, Properties
Suggested Formulations,
Laboratory Reports

■ **HUMAN and BOVINE PLACENTA EXTRACTS**

3 Types { Lyophilised
Filatov
Glycerol Glycolic

We'll be glad to send a copy if requested on your letterhead

R.I.T.A. CHEMICAL CORPORATION

612 N. MICHIGAN AVENUE CHICAGO 11, ILLINOIS

so elegant

REGENCY

Bottles by RICHFORD

Once in a great while a design comes along that is so perfect in concept and execution, so felicitious in shape and proportion that it becomes a classic at birth.

So it is with the new Richford Series, REGENCY.

As the illustrations so clearly show, Regency bottles look well with any of the exclusive Richford custom-engineered closures. They come with standard neck finishes in ½, 1, 2, and 3 ounce sizes and with Spillproof finishes in ½ and 1 ounce sizes.

Be among the first to develope your own exclusive packaging line with Regency. Write today for samples and catalog of the full Richford Line.

Ideal for Nail Polish — ½-oz. size

RICHFORD CORPORATION

Showrooms:
Empire State Building
350 5th Ave., N. Y., N. Y.

Offices and Plant:
3618 Oceanside Road
Oceanside, N. Y.

"Your Product Deserves Richford"

American Perfumer
November • 1961
VOLUME 76 NO. 11

Preparation and Properties of Alpha-Diketones

BY DR. KURT KULKA
Fritzsche Brothers Inc., New York, N. Y.

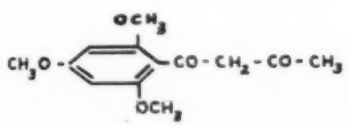
WHILE MANY OF THE MONOKETONES are well known to perfume and flavor chemists, the literature dealing with perfume and flavor materials has brought only a small number of diketones to the attention of these specialists. The rather pronounced and diversified chemical reactivity of many diketones, which can result in slowly progressing organoleptic changes of perfume and flavor compounds, might explain the limited application of these chemicals. On the other hand, if properly and chemically balanced, selected diketones will give unexpected effects in many of the above-mentioned compounds.

Monoketones are found in nature in a great number. Diketones however, which, as their name indicates, have two carbonyl groups in their molecule, are represented there only to a small extent. Some of the more important naturally occurring diketones are listed here.

According to Guenther[1] diacetyl, the lowest member of this group of chemicals, has been identified in many essential oils, for example in oil of cypress, savin, vetiver root, orris root, caraway, angelica root, etc.

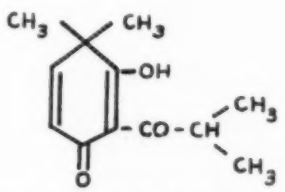
Another interesting compound, belonging to this class of diketones, is Eugenon:

Eugenon



It is found in the oil from wild growing *Eugenia caryophyllata*. Schmid and Meijer[2] established the above structural formula by synthesis and by other means. This diketone is the first, and so far, the only representative of the benzoylacetone structure found in nature.

xanthostemon:

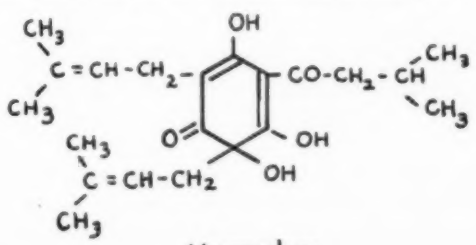


was isolated from the essential oil of *Xanthostemon oppositifolius* by Birch and Elliot[3] who also established its structure.

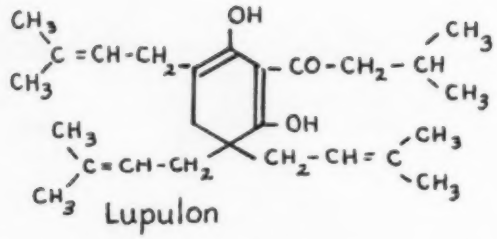
The separation of the many constituents of hops (also known as "Humulus", "Lupulus", or "Fructus Lupuli") and the elucidation of the structures of these compounds was the topic of extensive research. A relatively large number of diketones were identified in this natural product. They are:

Cohumulon:	$C_{20}H_{28}O_5$
Colupulon:	$C_{25}H_{36}O_4$
Adhumulon:	$C_{21}H_{30}O_5$
Humulon:	$C_{21}H_{30}O_5$
Lupulon:	$C_{26}H_{38}O_4$

The structures of two of these diketones are:



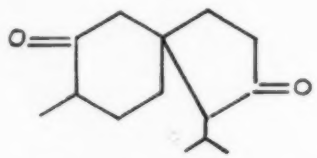
Humulon



Lupulon

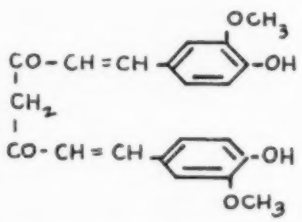
A noticeable feature of all of the above mentioned diketones found in hops is that the carbon atom of one of the carbonyl groups is a member of a six-membered ring system.

In this connection there should also be mentioned:



Acoron

a constituent of calamus oil which was described by Sorm et al[4].

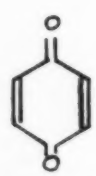


Curcumin:

an orange-yellow crystalline compound which is a constituent of the roots of *Curcuma longa L. Zingiberacea*. Curcumin produces in alkaline medium a reddish brown, and under acidic conditions, a light yellow color.

Diketones can be classified according to the position of their two carbonyl groups, for example:

1. Alpha-Diketones: (also known as 1,2-diketones or vicinal diketones) R–CO–CO–R′
2. Beta-Diketones: (also known as 1,3-diketones) R–CO–C(H)–CO–R′
3. Gamma-Diketones: (also known as 1,4-diketones) R–CO–C(H)–C(H)–CO–R′



Quinones:

having two doubly bonded oxygen atoms linked to two nuclear carbon atoms, these substances while in fact being diketones, are generally considered as a separate group.

Alpha-diketones

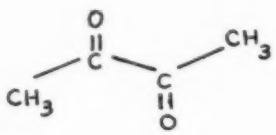
The aliphatic alpha-diketones, in dilution, display pleasant, sweet, aromatic notes. Diacetyl is used extensively in butter flavor compositions, coffee aromas and to a lesser extent, in perfume compounds. The basic odors of the higher homologs of diacetyl are reminiscent of the scent of their parent compound and therefore all resemble each other to some extent in odor. In addition, they have individual, highly distinguishable odoriferous qualities which invite their selective applications. Thus some of these homologs can be used, for example, in combination with diacetyl to give more pleasant bouquets.

The following are the better known homologs of diacetyl:

acetylpropionyl:	$CH_3COCOCH_2CH_3$
acetylbutyryl:	$CH_3COCOCH_2CH_2CH_3$
acetylisobutyryl:	$CH_3COCOCH(CH_3)_2$
acetylisovaleryl:	$CH_3COCOCH_2CH(CH_3)_2$
acetylcapryl:	$CH_3COCOCH_2(CH_2)_3CH_3$
dipropionyl:	$CH_3CH_2COCOCH_2CH_3$
propionylbutyryl:	$CH_3CH_2COCOCH_2CH_2CH_3$
dibutyryl:	$CH_3CH_2CH_2COCOCH_2CH_2CH_3$
diisobutyryl:	$(CH_3)_2CHCOCOCH(CH_3)_2$

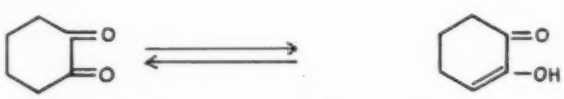
Mutual repulsion between the two carbonyl groups in acyclic diketones of this type necessitate stabilization of their molecules in the trans configuration.

Thus diacetyl, as an example, has the following structure:



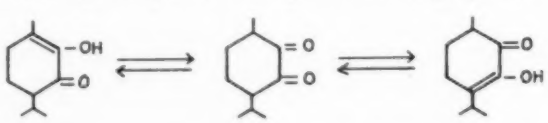
Cyclic and aromatic alpha diketones are mostly solids. Their odors are less penetrating and more subdued when compared with those of their aliphatic relatives.

Cyclic 1:2 diketones share with many of the 1:3 diketones the phenomenon of enolic tautomerism. Thus, 1,2-cyclohexanedione exists actually in the two forms:



The enolic form has "acidic" properties and gives a positive color test with ferric chloride.

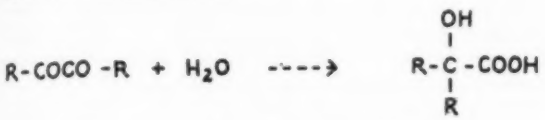
Diosphenol (Buchu-camphor) the main constituent of oil of buchu leaves, is an example of a naturally occurring compound having tautomeric properties.



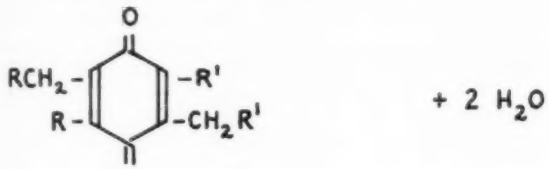
Alpha diketones undergo a variety of chemical reactions and a few of the more important ones are mentioned here.

1. The well known benzilic rearrangement is brought about by the addition of one mole of water

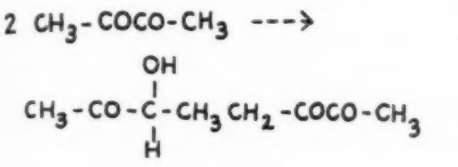
under alkaline conditions. The reaction is specific for aromatic diketones:

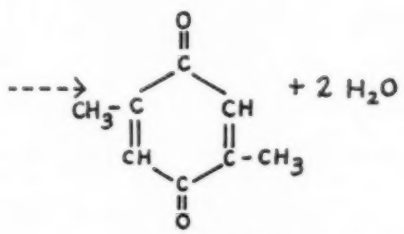


2. Alpha diketones having active methylene groups under alkaline conditions yield quinones:



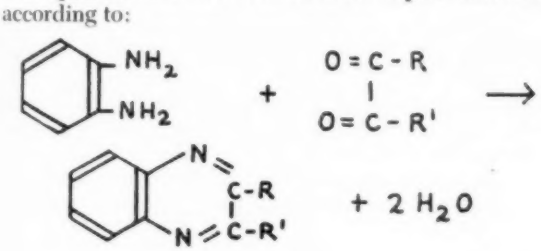
Diacetyl reacts as follows:





p-xyloquinone

3. Quinoxalines are formed from alpha diketones according to:



This reaction can take place only with alpha diketones. It is used therefore, to distinguish between alpha and other diketones.

Preparation of alpha-diketones

a. From vicinal glycols: Ketones will result from secondary alcohols after the loss of hydrogen. Thus vicinal glycols, where the two alcohol groups are secondary, will yield, after the loss of hydrogen, alpha-diketones.

The following examples are intended to illustrate the procedure:

According to Weinkauff[5] diacetyl is obtained from 2,3-butanediol as follows:

Eight grams copper chromite catalyst are suspended in 100 cc. white mineral oil, having a boiling range of 338-400°. The suspension is heated to 250° and under agitation, 38.6 g. of 2,3-butanediol are gradually added, keeping the flask temperature at 270-290°. The vaporized reaction product is taken through an efficient fractionating column. The condensed product separates into two layers:

Upper layer: 95% diacetyl, 5% water,
Bottom layer: 30% diacetyl, 70% water.
The reaction proceeds over two steps:
First the acyloin: $CH_3CH(OH)$-CO-CH_3 is formed,
which in the second stage is converted to diacetyl.

The realization of this mechanism is important because it proves that acyloins, which are obtainable by other syntheses, are valuable starting materials for the preparation of diketones.

McAllister and Simo[6] described the oxidation of polyhydric alcohols such as 2,3-butylene glycol to the corresponding diketones by a measured amount of oxygen in the presence of a catalyst such as activated copper at a temperature of 270°.

Kritchevsky[7] obtained diacetyl in a yield of 60% by passing the vapors of 2,3-butylene glycol over a copper chromite or brass catalyst at 300-600° in the absence of oxygen.

b. From the mono-oxime of alpha-diketones: A methylene group adjacent to a carbonyl group of a ketone can be nitrosated to give the mono-oxime of the 1,2-diketone (isonitroso-ketone)

On hydrolysis of the isonitroso-ketone the diketone is obtained. Another way to liberate the diketone is by an exchange reaction with formaldehyde which is converted to formoxime. The reaction was first described by v. Pechmann[8] and is still widely used.

The reaction of ketones having the general formula CH_3COCH_2—R can produce only one diketone. Unsymmetrical dialkyl ketones in which the carbonyl group is flanked by two methylene groups, R—CH_2COCH_2—R′ can give two isomeric diketones.

The nitrosation is accomplished by nitrous acid, which can be obtained in various ways, such as: 1. reaction of an alkyl nitrite with hydrochloric or sulfuric acid. 2. reaction of an alkyl nitrite with a sodium alkoxide in alcohol. 3. nitrous oxide gas. 4. nitrosyl chloride.

Because of its simplicity, the preparation of diacetyl, as conducted by Diels et al[9] will be described.

850 g methyl ethyl ketone, 30 cc. conc. aqueous hydrochloric acid and 1000 cc. amylnitrite are brought into reaction. The resulting diacetyl-ammoniumoxime is treated with dilute sodium hydroxide solution and then neutralized with dilute sulfuric acid. To the resulting reaction mixture 300 cc. sulfuric acid is added and the diacetyl is separated from this mixture by steam distillation. The steam distillate is saturated with salt, the diacetyl separated and rectified by fractionation. From 4000 g. methyl ethyl ketone, 1300 g. diacetyl is obtained.

To illustrate the preparation of a monoxime of a 1,2-diketone, the technique applied by Semon and Damerell[10] should be mentioned here:

620 g. purified methyl ethyl ketone is combined with

40 cc. hydrochloric acid (sp. gr. 1.19). Gaseous ethyl nitrite is fed as fast as possible into the above agitated mixture and the temperature kept below 55°. The crude reaction product is neutralized with conc. aqueous ammonia. The resulting monoxime of diacetyl is distilled.

Yield: 480-520 g.

Ethyl nitrite can be prepared as follows:

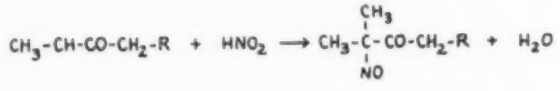
A solution of 440 g. sulfuric acid (255 cc. sp. gr. 1.84) and 210 g. alcohol diluted with water to make a total of 2.5 liter is added to a solution of 620 g. (9 moles) sodium nitrite and 210 g. alcohol to make a total volume of 2.5 liter.

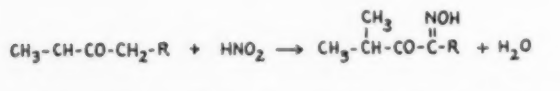
It is often more convenient to replace a gaseous nitrite with a (higher boiling) liquid nitrite, such as n-butyl nitrite. This can be prepared by adding a solution of dilute sulfuric acid and n-butyl alcohol to an aqueous solution of sodium nitrite, as described by Noyes[11].

The hydrolysis of the isonitroso-ketone to the diketone: $R{-}C(=NOH)COR' + H_2O \xrightarrow{H_2SO_4} RCOCOR' + NH_2OH$ is illustrated in the preparation of acetylbenzoyl from its monoisonitroso compound, according to Hartman and Roll[12].

50 g. (0.31 moles) isonitrosopropiophenone (prepared according to Org. Synth. Coll. Vol. II, 303), and 500 g. 10% aqueous sulfuric acid are combined and steam distilled. Approximately 2000 cc. steam distillate is collected. The volume in the flask is kept constant by applying heat. The organic layer is separated from the steam distillate, the aqueous layer saturated with salt and then extracted with ether. The ether extract is combined with the organic part, and after removal of the solvent, it is fractionated. The yield is 30-32 g. (66-70%).

Aston and Mayberry[13] reported that on reaction of ethyl nitrite with isopropyl or cyclohexyl ketone using acetyl chloride or gaseous hydrochloric acid as catalyst, substitution occurs on the branched alpha carbon as well as on the primary alkyl group.





The process will be described in the following examples:

45 g. ethyl isopropyl ketone is combined with
5 g. acetyl chloride.

Over a period of 2½ hours at a temperature of 45-55° the theoretical amount of dry, gaseous ethyl nitrite is added (18 g. ethyl nitrite is absorbed).

On standing over night under cooling 15.2 g. almost pure bimolecular ethyl alpha nitrosoispropyl ketone precipitates. The mother liquor, 31.7 g. is cooled in an ice bath and agitated with 40 cc. 10% sodium hydroxide solution. On standing, 9 g. of a non-aqueous layer separates. It is extracted with ether to remove any unreacted starting material. The aqueous part is cooled and acidified with dilute sulfuric acid. 5.7 g. alpha isonitroso ethyl isopropyl ketone will separate. The above ether extract is combined with 9 g. of the material which was insoluble in the dilute sodium hydroxide solution and on fractionation, 7.3 g. of the starting material (ketone) will be recovered.

c. From the reaction of isonitrosoacetone with a diazonium compound: As an example, the preparation of acetylbenzoyl: $C_6H_5COCOCH_3$ from isonitrosoacetone with diazobenzene is described:

18.6 g. aniline are dissolved in 250 cc. dilute hydrochloric acid and then reacted with 13.8 g. sodium nitrite dissolved in 70 cc. water. The resulting diazoproduct is added under ice cooling and agitation to 17.4 g. isonitrosoacetone in 320 cc. of a 10% aqueous sodium hydroxide solution. After completion of the reaction, the reaction mass is filtered from the formed resinous material and is acidified with dilute acetic acid. The precipitated acetylbenzoyl-monoxime is recrystallized from alcohol in the presence of activated carbon and is reacted with 60 cc. 10% aqueous sulfuric acid to obtain the diketone in almost theoretical yield.

Acetylbenzoyl, while having an odor faintly reminiscent of diacetyl, distinguishes itself from this alpha diketone by a more sophisticated, flowery sweet note, which makes this diketone an interesting perfume compound.

d. From the oxidation of a reactive methylene group with nitrogen tetroxide. A rather important reaction of aryl alkyl ketones to give vicinal diketones was described by Coles, Manske and Johnson[14] and will be illustrated in the following example:

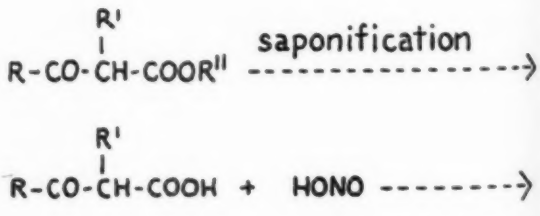
A mixture of 134 g. ethylphenyl ketone, 35 g. anhydrous calcium chloride (finely powdered), and 1 cc. of a saturated alcoholic hydrochloric acid solution is treated at 60° with a stream of approximately 60 g. nitrogen tetroxide (N_2O_4). The cooled reaction product is taken up in ether, washed with water, aqueous sodium bicarbonate solution, and again with water. After removal of the solvent by distillation, the resulting diketone is purified over its bisulfite compound to give 26-28 g. of 1-phenyl-1,2-propanedione, which is an important intermediate in the synthesis of certain pharmaceuticals. 60-70 g. unreacted starting material is recovered.

Riebsomer[15] in his review on the reaction of nitrogen tetroxide with organic compounds makes reference to the following:

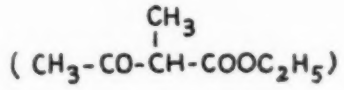
The reaction of methyl ethyl ketone with nitrogen tetroxide does not yield diacetyl (although it was expected).

Bouveault and Wahl reacted ethyl acetoacetate with "nitrous fumes" and obtained the diketone: $CH_3COCOCOOC_2H_5$.

e. From the nitrosation of alkylated beta keto esters: This synthesis proceeds according to:



In the simplest example of this reaction, diacetyl is obtained from methyl-ethyl-acetoacetate



While this reaction is generally applicable, it will be considered in special cases only, for example where R and R′ are selected groups.

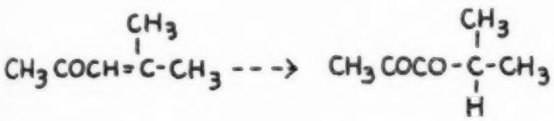
f. From alpha-beta unsaturated ketones: Many of these ketones are readily available; thus, they are convenient starting materials. In one synthetic approach the unsaturated ketone is brominated, then reacted with a dilute mineral acid to give the desired alpha-diketone:

$$R\text{–}CO\text{–}CH=CH\text{–}R' + Br_2 \xrightarrow{-HBr} R\text{–}CO\text{–}CHBr\text{–}CHBr\text{–}R'$$

$$R\text{–}CO\text{–}CHBr\text{–}CHBr\text{–}R' \xrightarrow{\text{piperidine}} R\text{–}CO\text{–}CBr=CH\text{–}R' + \text{piperidine} \xrightarrow{-HBr} R\text{–}CO\text{–}CBr(NC_5H_{10})\text{–}CH_2\text{–}R'$$

$$R\text{–}CO\text{–}CBr(NC_5H_{10})\text{–}CH_2\text{–}R' \xrightarrow{\text{acid hydrolysis}} R\text{–}CO\text{–}C(NC_5H_{10})=CH\text{–}R' \longrightarrow R\text{–}CO\text{–}C(OH)=CH\text{–}R' \longrightarrow R\text{–}COCO\text{–}CH_2R'$$

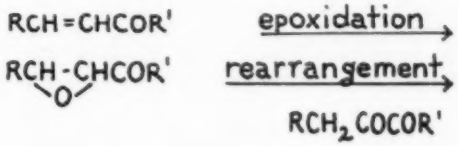
Dufraise and Moureau[16] who described this reaction in detail, applied it with many alpha-beta-unsaturated ketones and obtained, for example, acetylisobutyryl from mesityloxide:



In practice, the reaction can be conducted in one operation:

The mole-equivalent of bromine in a solvent (such as ether) is added to the unsaturated ketone to form the di-bromide. The di-bromide is treated with 4 moles of piperidine. After completion of this step, a mineral acid in excess (for example an aqueous 10% sulfuric acid solution) is gradually added to the reaction mass to liberate the diketone.

In a different synthetic approach the epoxide is formed which is then rearranged to the diketone:

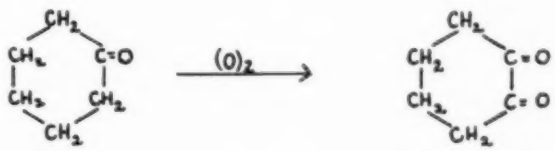


This process was described in detail by Barnes[17].

g. From the oxidation of a methylene group adjacent to a carbonyl group: Catalytic oxidation of a monoketone to the diketone can be accomplished according to Dutch Pat. 63,040, May 16, 1949, at 150-450° using an oxide of copper, lead, manganese or vanadium as the catalyst.

Selenium dioxide or selenious acid can be generally applied in this type of oxidation with cyclic ketones, dialkyl ketones, aryl-alkyl ketones and aryl benzyl ketones.

The reaction will be illustrated by the oxidation of cyclohexanone to 1,2-cyclohexanedione, as described by Hach, Banks and Diehl[18].



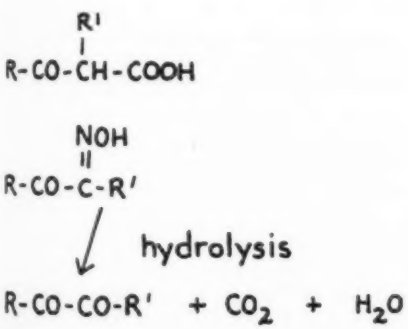
To 1.708 g. (15.2 moles) cyclohexanone, a solution of 387 g. (3 moles) selenious acid (H_2SeO_3) 500 cc. dioxane and 100 cc. water is added over a period of 3 hours under efficient cooling. As the reaction proceeds, red, amorphous selenium gradually appears. After completion of the addition, agitation is continued for 5 hours under cooling and for an additional 6 hours at room temperature. The precipitated selenium is then separated by filtration and is extracted with 300 cc. 95% ethanol (hot) and the extract decanted from the now, gray hexagonal selenium which can be converted to the dioxide and re-used. The filtrate is combined with the alcoholic extract and after removal of the solvent it is fractionated and re-fractionated to give the diketone in a 63% yield, based on the selenious acid used.

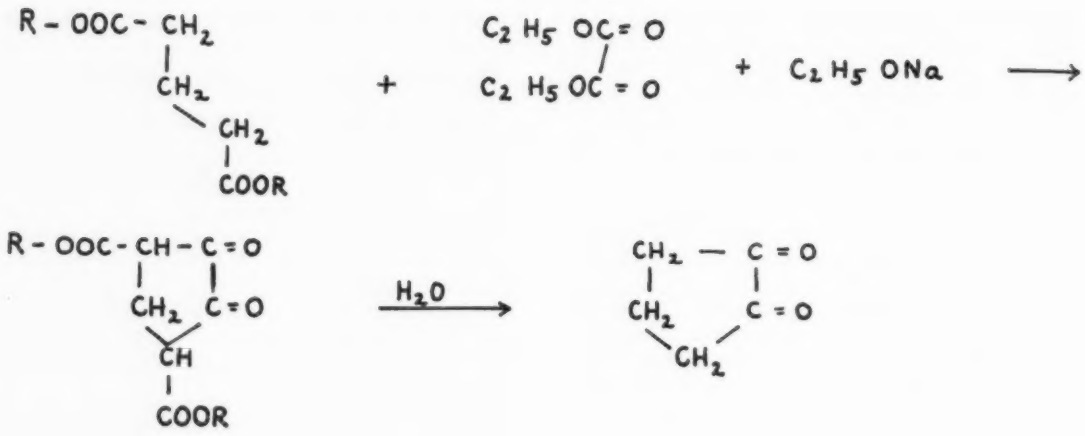
Another example in which selenium dioxide is used, was reported by Haar, Voter and Banks[19] who obtained 1,2-cycloheptanedione from cycloheptanone.

To a refluxing solution of 336 g. (3 moles) cycloheptanone in 700 cc. absol. alcohol, is added during 1½ hours, a solution of 333 g. (3 moles) sublimed selenium dioxide dissolved first in 500 cc. absol. alcohol to which solution 1,600 cc. 95% ethanol was added. Reflux is maintained for an additional 6 hours. After standing at room temperature for 18 hours, the reaction mixture is filtered to separate the precipitated selenium, 1,000 cc. alcohol is removed by distillation and the diketone is eventually obtained in a 90% yield by fractional distillation.

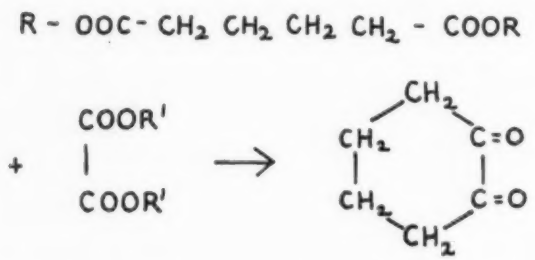
h. Alpha diketones by the Dieckmann Reaction: Cyclic diketones are obtained by the condensation of esters of two different dibasic acids. Hesse and Bucking[20] investigated this modification of the Dieckmann reaction.

1,2-dicyclopentanedione can be prepared from diethyl glutarate and diethyl oxalate:





1,2-cyclohexanedione can be synthesized by the reaction of an ester of adipic acid with an ester of oxalic acid:



i. Reduction of a secondary hydroxyl group adjacent to a carboxyl group: Aliphatic compounds of the general formula R–CH(OH)CO–R′ are known as "acyloins" and their aromatic counterparts as "benzoins". The formation of acyloins was first observed by Bouveault and Blanc, as a side-reaction, in their well known sodium reduction of esters to the corresponding alcohols. The reaction of esters with sodium applying specific favorable conditions is today still a practical method for the preparation of acyloins. A review on acyloins and benzoins has been given by McElvain[21].

While, in general terms, the benzoins lend themselves better to a great number of oxidation processes, resulting in good yields of diketones, compared with their aliphatic counterparts, both types of hydroxy ketones are valuable starting materials for the preparation of alpha-diketones.

The oxidation of benzoin to benzil, as described by Clarke and Dreger[22] will illustrate the process:

$$C_6H_5{\cdot}CH(OH)COC_6H_5 + (O) - - \rightarrow$$

$$C_6H_5COCOC_6H_5 + H_2O$$

4,100 g. (16.4 moles) crystalline copper sulfate, 4,000 g. techn. pyridine and 1,600 cc. water are heated under agitation until a solution results. To this solution are added 1,696 g. (8 moles) benzoin, and heating and agitation are continued for 2 hours. After cooling, the copper sulfate-pyridine solution is separated (it can be re-oxidized and after addition of 200 g. pyridine, applied for the oxidation of another 1,696 g. benzoin). The resulting crude benzil is washed with water, heated with 3-4,000 cc. 10% hydrochloric acid. On cooling, the purified benzil will crystallize. It is collected on a Buchner funnel, washed with water and recrystallized from carbon tetrachloride. The yield is 86% of the theoretical.

A rather large number of other excellent oxidation procedures is at the disposition of the organic chemist and only a few additional examples need to be mentioned here.

Anisil was obtained from anisoin by Biltz and Wieland[23] in the following way:

1 g. anisoin, 70 g. of a 5% aqueous potassium hydroxide solution are combined and heated on a steam bath while air is drawn through the solution. The anisoin disappears gradually while the crystalline anisil is formed. The yield is 80% of the theoretical.

An oxidation procedure, which is applicable to aromatic as well as to aliphatic hydroxyketones, was described by Rigby[24].

To a refluxing, agitated solution of the hydroxyketone, acetic acid and a glycol monomethyl ether, is added 1.2 times the theoretical amount of bismuth-trioxide (Bi_2O_3). The reaction is permitted to proceed over a period of 1-1½ hours. The reaction mixture is then filtered while still hot. The solvent is removed by distillation and the remaining part is extracted with benzene, from which the diketone is liberated by stripping off the solvent.

A noteworthy process is that of Weiss and Appel[25]:

$$R{-}CH(OH)CO{-}R + 2\,Cu(OAc)_2 - - \rightarrow$$
$$R{-}COCO{-}R + 2\,CuOAc + 2\,AcOH.$$

$$2\,CuOAc + NH_4NO_3 + AcOH - - \rightarrow$$
$$2\,Cu(OAc)_2 + NH_4NO_2 + H_2O.$$

$$NH_4NO_2 - - \rightarrow N_2 + 2\,H_2O$$

In this process, the oxidation of benzoin and other hydroxyketones can be accomplished with yields ranging from 90-100% of the theoretical. A catalytic amount of a cupric salt is used which may be regenerated internally by ammonium nitrate. The reaction is conducted in acetic acid solution, which actually has a two-way action: a.) decomposing the formed ammonium nitrite, b.) to act as a solvent for the crystallization of the diketone. It was found that besides cupric salts, other salts such as iron, nickel and cobalt salts can be applied with equally good results.

The following is an example of the procedure:
636 g. (3 moles) crude benzoin, 300 g. (3.75 moles) ammonium nitrate, 6 g. cupric acetate, 2,100 cc. 80% acetic acid (by volume) are combined and heated under agitation to secure complete solution. The agitation is stopped and a vigorous evolution of nitrogen will occur. After cessation of this gas evolution, the reaction mass is refluxed for 1½ hours to complete the process. After cooling the product is seeded with a crystal of benzil and crystallization permitted to take place under agitation. Yield: 90% of the theoretical. A second charge of benzoin and ammonium nitrate can be added to the filtrate and reacted as before to give an approximate theoretical yield.

Chromic acid oxidation and catalytic vapor phase oxidation, as initially described by Bouveault and Laquin[26], have to be mentioned as possibilities for the conversion of the hydroxyl group to the carbonyl group resulting in the 1,2-diketone.

For example, Mailhe[27] reacted acetyl phenylcarbinol over a copper catalyst at 350° and obtained acetylbenzoyl in good yields. An improved chromic acid oxidation, which was applied to cyclohexanols, deserves to be considered. Hussey and Baker[28] used sodium dichromate in a 20% excess over the stoichiometric amount and brought only the theoretical amount of sulfuric acid into the reaction. These combined agents, as an aqueous solution, were gradually added to a warm, aqueous slurry of the cyclic alcohol resulting in a highly increased yield of the keytone compared with those obtained by the conventional chromic acid oxidations.

j. Reaction of a hydroxyketone with an aldehyde: The preparation of alpha-diketones by the reaction of a hydroxyketone with an aldehyde in the presence of an acid, was disclosed by Dermer[29]:

$$R\text{–}COCH_2OH + R'\text{–}CHO \dashrightarrow R\text{–}COCOCH_2R' + H_2O$$

An example is the preparation of diacetyl:
78.5 g. 93% acetol (the rest is mostly water), 37.9 g. paraformaldehyde, 200 cc water and 32 cc. conc. hydrochloric acid are combined and slowly distilled through a fractionation column having 20 theoretical plates. The distillate contains the water-diacetyl azeotope from which the diacetyl is liberated. Yield: 83% of the theoretical based on the acetol.

Other diketones prepared by this procedure are: 1-phenyl-2,3-butane-dione (from benzaldehyde and acetol), 2,3-pentanedione and 2,3-hexane-dione.

k. Alpha-diketones from unsaturated compounds: A variety of unsaturated compounds lends itself well to the preparation of 1,2-diketones.

Carter[30] reacted methyl vinyl ketone, $CH_3COCH = CH_2$, with mercuric sulfate under acidic conditions to obtain diacetyl.

Eberhardt and Liesberg[31] reacted diacetylene, $CH \equiv C\text{–}C \equiv CH$, and vinylacetylene, $CH \equiv C\text{–}CH = CH_2$, with a "catalytic" solution consisting of a strong oxygen containing inorganic acid and the mercuric salt of this acid at a temperature of 70-100° to yield diacetyl in both cases.

Cabert and Price[32] obtained diacetyl by passing vinylacetylene into a solution of mercuric sulfate in sulfuric acid and decomposed the reaction product with hydrochloric acid at a temperature of 95-100° to liberate the diketone.

Friedrich, Laib and Henkel[33] observed the rearrangement of 1,4-dialkyl-2-butine-1,4-diols of the general formula:

$$R\text{-}\underset{\displaystyle OH}{\underset{|}{C}}H\text{-}C{\equiv}C\text{-}\underset{\displaystyle OH}{\underset{|}{C}}H\text{-}R' \quad \text{to 1,2-diketones, } R\text{-}COCOCH_2CH_2R'.$$

The process is conducted as follows:
570 parts of hexine-(3-diol)-2,5) are heated under agitation to 120-130° for 6 hours with a solution of 10 parts mercury sulfate, 1 part phosphoric acid 80%, and 1000 parts of water. Then another 46 parts of phosphoric acid 80%, are added, and heating and agitation is continued for 4 hours. The formed 2,3-hexanedione is steam distilled. After fractional distillation, 270 parts of the pure diketone result. The remaining acid solution can be neutralized and 130 parts of unreacted starting material is recovered.

References

1. Guenther. The Essential Oils. Van Nostrand Comp. New York. (1957)
2. Schmid and Meijer. Helv. 31. 748 (1948)
3. Birch and Elliot. Australian J. Chem. 9. 238-40 (1956)
4. Sorm et al. Chemistry and Industry. 1231 (1956)
   1072 (1958)
5. Weinkauff. US. Pat. 2,455,631 (1948)
6. McAllister and Simo. US. Pat. 2,051,266 (1936)
7. Kritchevsky. US. Pat. 2,462,107 (1949)
8. v. Pechmann. Ber. 20. 3162. 3213 (1887)
   21. 1411. 2119 (1888)
9. Diels et al. Ber. 35. 3290. (1902)
   40. 4336. (1907)
10. Semon and Damerell. Org. Synth. Coll. Vol. II. 204 (1943)
11. Noyes. Org. Synth. Coll. Vol. II. 108 (1943)
12. Harrman and Roll. Org. Synth. Col. Vol. III. 20.
13. Aston and Mayberry. JACS. 54. 1530 (1932)
    57. 1880 (1935)
14. Coles, Manske and Johnson. JACS. 51. 2271 (1929)
15. Riebsomer. Chem. Reviews. (1945)
16. Dufraise and Moureau. c.r. 99. 184.
17. Barnes. JACS. 57. 937 (1929)
18. Hach, Banks and Diehl. Org, Synth. Vol. 32. 35 (1952)
19. Haar, Voter and Banks. J. Org. Chem. 836. 14 (1949)
20. Hesse and Bucking. Ann. 31. 563. (1949)
21. McElvain. Org. Reactions. Vol. IV. (1948)
22. Clarke and Dreger. Org. Synth. Coll. Vol. I. 87 (1932)
23. Biltz and Wieland. Ann. 8. 308 (1899)
24. Rigby. J. Chem. Soc. 793. 1950 (1924)
25. Weiss and Appel. JACS. 3666. 70 (1948)
26. Bouveault and Lacquin. Bull. Soc. Chim. France. (III) 35. 650 (1906)
27. Mailhe. Bull. Soc. Chim. France. (IV) 15. (1914)
28. Hussey and Baker. J. Org. Chem. 25. 1434 (1960)
29. Dermer. US. Pat. 2,799,707 (1956)
30. Carter. US. Pat. 2,145,388 (1939)
31. Eberhardt and Lieseberg. US. Pat. 2,110,699 (1938)
32. Cabert and Price. J. Dairy Sci. 32. 515 (1949)
33. Friedrich, Laib and Henkel. US. Pat. 2,789,141 (1957)

Evaluation of Esters of HPC as Emulsifying Agents

BY S. C. R. CHOKHAVATIA, Alembic Chemical Co., Baroda, India
and J. AUTIAN, Associate Professor of Pharmacy, The University of Texas, College of Pharmacy, Austin.

IN A REVIEW OF NEW SURFACE ACTIVE AGENTS as possible emulsifying agents, our attention focused upon a series of synthesized compounds. The structural formula of the parent compound is shown in Figure 1 and is identified with the chemical name, octakis (2-hydroxypropyl) sucrose*[1]. The compound, hereinafter referred to as HPC, is a viscous, yellow liquid prepared by the reaction of sucrose with propylene oxide. Other physical properties of this propoxylated sucrose are summarized in Table I.

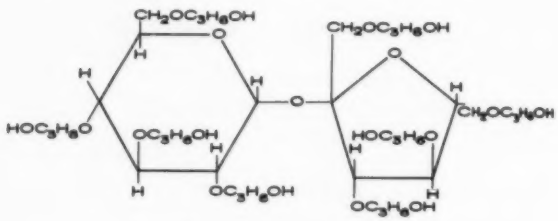


Figure 1. Structure of HPC

Table I. - Physical Properties of HPC

Specific Gravity at 20° C	1.160 - 1.180
Volatility, 1 hr. at 145° C and 0.4 mm. Hg.	Maximum - 3%
Viscosity, Cps, of 75% aqueous solution at 25° C	490 - 660
Solubility	soluble in water, methanol, ethanol and acetone
	insoluble in benzene, carbon tetrachloride and n-heptane
Surface tension (1% by weight)	35.1 dynes/cm.

Table II. - Approximate HLB Values for Esters of HPC

Ester	HLB Value
Monococonate	17.6
Monolardate	16.0
Monolaurate	16.0
Monotallowate	14.8
Monomyristate	14.5
Monopalmitate	14.2
Monolinoleate	13.9
Dioleate	11.6
Dipalmitate	11.0
Distearate	10.9
Tetralinoleate	10.6
Dilardate	10.4
Octaoleate	9.5
Trioleate	9.5
Trilaurate	9.4
Trilardate	9.4
Tripalmitate	9.3
Tristearate	9.1
Tetralaurate	9.1
Trilinoleate	9.0
Tetrapalmitate	8.0

Esterification[2] of one or more of the hydroxyl groups in the molecule of HPC with a lipophilic group or groups gives surface active properties to the molecule. The selection of the lipophilic group and the numbers of such groups attached to the molecule of HPC will determine the HLB** value of the compounds. Monosubstitution of a coconate group in the molecule will produce a compound having an HLB of 17.6, while replacing four of the hydrogens of the hydroxyl groups with palmitate will give an HLB of 8.0.

Cross combinations of these HPC esters will thus make possible a combination of emulsifying agents giving HLB values within the range of 8 to 17.6, a range considered optimal for the production of o/w emulsions.

Table II includes approximate HLB values for a number of esters of HPC. The desire to investigate these esters as emulsifying agents was intensified by two considerations. They were:

*Hyprose is a registered trademark of The Dow Chemical Company, Midland, Michigan, for this compound.
**HLB—hydrophile-lipophile balance.

Table III. - Basic Emulsion Formulas Containing 48% Oil and 4.75% of HPC Ester as Emulsifying Agents*

Formula	HLB **	Oil		Distilled Water (Gms.)	Grams			
		Name	Gms		Stearate		Oleate	
					mono	tetra	mono	tetra
A	9.7	Cottonseed	1250.00	1250.00	36.75	88.25	-	-
B	9.2	Cottonseed	1250.00	1250.00	-	-	15.60	109.40
C	9.7	Olive	1250.00	1250.00	15.60	109.40	-	-
D	8.8	Olive	1250.00	1250.00	-	-	7.00	118.00
E	8.8	Coconut	1250.00	1250.00	17.50	107.50	-	-
F	8.8	Coconut	1250.00	1250.00	-	-	5.50	119.50
G	9.5	Corn	1250.00	1250.00	33.50	91.50	-	-
H	9.0	Corn	1250.00	1250.00	-	-	11.00	114.00

* Total quantity of each emulsion - 2625.00 Gms.
** Approximate HLB of emulsion calculated from quantity of emulsifying agents in each formula

TABLE IV. Size Frequency Distribution of Emulsions Homogenized for Various Periods of Time (Emulsions containing 4.75% Emulsifying Agents)*

Formula	Time															
	10 (minutes)					20 (minutes)						30 (minutes)				
	** 0.75	2.25	3.75	5.25	6.75	0.75	2.25	3.75	5.25	6.75	8.25	9.75	2.25	3.75	5.25	6.75
A	839	137	20	3	-	881	108	8	2	-	-	887	96	17	-	-
B	870	104	17	8	1	855	134	9	1	-	-	895	101	5	-	-
C	895	101	3	1	-	909	86	5	-	-	-	928	71	-	-	-
D	913	87	-	-	-	920	80	-	-	-	-	922	78	-	-	-
E	876	119	4	-	-	882	109	9	-	-	-	893	101	5	1	-
F	856	133	11	-	-	866	122	12	-	-	-	885	106	9	-	-
G	857	129	10	4	-	866	132	2	-	-	-	855	130	12	3	-
H	855	138	7	-	-	847	148	5	-	-	-	865	128	6	1	-

* Samples taken after 24 hours (after end of homogenization)
** Mid-points of class groups expressed in microns

1. The structure of the compounds would indicate that these esters would not be toxic for either oral or intravenous administration in the form of an emulsion.

2. The compounds are essentially tasteless and would not impart any objectionable taste or aroma to a pharmaceutical product.

The above two points would place the esters of HPC at a distinct advantage over the polyoxyethylene sorbitan compounds, since these agents (sorbitan) have been shown to cause toxic reactions when administered intravenously into animals[3]. Also the sorbitan compounds impart a rather objectionable taste to medicinal products.

Preliminary examination and exploratory experimentation gave information which indicated that four of the HPC esters (monostearate, tetrastearate, monooleate and tetraoleate) warranted further investigation as emulsifying agents. These four compounds appeared to be the most promising in the series, at least from the initial assessment and, consequently, are included in the study presented in this paper.

Experimental

Supplies

Monostearate ester of HPC—The Dow Chemical Company, Midland, Michigan
Monooleate ester of HPC— "
Tetrastearate ester of HPC— "
Tetraoleate ester of HPC— "
Cottonseed oil, USP
Olive oil, USP
Coconut oil
Corn oil, USP
Sorbic acid—Chas. Pfizer & Company, Inc., Brooklyn 6, New York

TABLE V. Size Frequency Distribution of Emulsions Homogenized for Various Periods of Time (Emulsions containing 7.25% Emulsifying Agents)*

Formula	Time															
	10 (minutes)					20 (minutes)						30 (minutes)				
	** 0.75	2.25	3.75	5.25	6.75	0.75	2.25	3.75	5.25	6.75	8.25	0.75	2.25	3.75	5.25	6.75
A	875	118	5	-	-	898	101	3	-	-	-	880	113	7	-	-
B	874	119	4	1	-	888	108	4	-	-	-	885	107	8	-	-
C	885	104	10	1	-	884	114	2	-	-	-	869	127	4	1	-
D	862	129	9	-	-	873	119	1	-	-	-	856	133	10	-	-
E	855	127	14	3	-	871	121	6	-	-	-	865	130	4	1	-
F	860	120	11	1	-	879	116	5	-	-	-	880	111	8	-	-
G	863	120	14	2	-	877	116	7	-	-	-	870	120	10	-	-
H	842	139	18	1	-	855	133	12	-	-	-	839	146	13	2	-

* Samples taken after 24 hours (after end of homogenization)
** Mid-points of class groups expressed in microns

Other supplies or reagents

Apparatus

Waring blender

Laboratory Homogenizer (two-stage), Manton-Gaulin Mfg., Inc.

Beckman pH Meter, Model G

Brookfield Synchroelectric Viscometer

Selection of emulsion systems

Before actual evaluation of these esters could take place, it was necessary to conduct preliminary experiments for the sake of selecting a number of basic emulsion formulas which could then be utilized in subsequent experiments. These preliminary experiments included formulating emulsion systems with one of four oils and cross combining the four esters as the emulsifying agents. The four oils included in the various systems were: cottonseed oil, olive oil, coconut oil and corn oil. These emulsion systems were prepared by hand and passed through a hand homogenizer several times before storing them in wide-mouth bottles for a period of one week. At the end of a week, they were observed carefully, and the best in each series was selected as the emulsion system to be included in the various stability studies. Table III contains the formulas for the eight basic emulsions.

Preparation of Emulsions

The eight emulsion formulas (as shown in Table III) were prepared as described in the previous section, and then each emulsion type was divided into three portions. The first portion was passed and recycled through a two-stage homogenizer for a period of ten minutes; the second for a period of twenty minutes and the third, for a period of thirty minutes. (The pressure gage was adjusted to 300 p.s.i. for the first stage and 500 p.s.i. for the second stage.) Each portion was then placed into wide-mouth, eight ounce, screw capped bottles, labeled and stored under various conditions.

Another series of emulsions was prepared having the same formula as shown in Table III, but the total

TABLE VI. Effect of Length of Homogenization on Specific Interfacial Area ($cm^2 \times 10^4$)*

Formula	Containing 4.75% of Total Emulsifying Agents — Time (minutes)			Containing 7.25% of Total Emulsifying Agents — Time (minutes)		
	10	20	30	10	20	30
A	2.694	3.128	3.097	3.525	3.751	3.444
B	2.330	5.858	3.884	3.395	3.633	3.429
C	3.540	3.744	4.390	3.205	3.716	3.352
D	4.150	4.254	4.270	3.278	3.734	3.228
E	3.563	3.372	3.433	2.817	3.444	3.361
F	3.194	3.188	3.382	3.108	3.526	3.403
G	2.824	3.586	2.862	2.922	3.426	3.273
H	3.329	1.660	5.255	2.882	3.157	2.897

*Emulsion samples taken 24 hours after homogenization cycle

Table VII. - Stability of Emulsions Containing HPC Esters as Emulsifying Agents* (4.75%)

Formula		Room Temp. — Weeks			50° C — Weeks			Freezing and Thawing **
		4	8	20	1	3	8	
A	10	S	P	-	S	S	C	S
	20	S	P	-	S	C	-	S
	30	S	P	-	S	C	-	S
B	10	S	C	-	S	C	-	C
	20	S	C	-	C	-	-	C
	30	S	C	-	P	C	-	C
C	10	S	S	S·	S	S	S	S
	20	S	S	S·	S	P	C	S
	30	S	S	S·	S	P	C	S
D	10	S	S	-	S	S	S	C··
	20	S	S	-	S	S	C	C··
	30	S	C	-	S	S	C	C··
E	10	S	S	S	S	S	S	C
	20	S	S	S	S	S	S	C
	30	S	S	S	S	S	S	C
F	10	S	C	-	S	S	S	C
	20	S	C	-	S	S	S	C
	30	S	C	-	S	S	S	C
G	10	S	P	-	S	C	-	S
	20	S	P	-	C	-	-	S
	30	S	P	-	S	C	-	S
H	10	S	C	-	S	P	C	C
	20	P	C	-	S	S	C	C
	30	S	C	-	S	P	C	C

* Emulsions prepared with 48% Oil and 4.75% Emulsifying Agents
** 24 hour cycle of freezing and thawing for 4 weeks
S Stable Emulsion
P Poor Emulsion
C Phase Separation
· These emulsions were still stable after 40 weeks
·· Phase separation at the end of first cycle

Table VIII. - Stability of Emulsions Containing HPC Esters as Emulsifying Agents* (7.25%)

Formula		Room Temp. — Weeks			50° C — Weeks			Freezing and Thawing **
		4	8	12	1	3	8	
A	10	S	S	S	S	C	-	S
	20	S	S	S	S	S	S	S
	30	S	S	S	S	S	P	S
B	10	S	P	-	S	S	P	C
	20	S	P	-	P	C	-	C
	30	S	P	-	S	S	P	C
C	10	S	S	S	S	S	S	S
	20	S	S	S	S	S	P	S
	30	S	S	S	S	S	S	S
D	10	S	S	S	S	S	C	C··
	20	S	S	S	P	C	C	C··
	30	S	P	P	S	S	S	C··
E	10	S	S	S	S	S	C	C
	20	S	S	S	S	P	C	C
	30	S	S	S	S	P	C	C
F	10	S	S	P	S	C	-	C
	20	S	S	S	S	C	-	C
	30	S	S	S	P	C	-	C
G	10	S	P	P	S	P	P	S
	20	S	S	S	S	S	P	S
	30	S	S	P	S	S	P	S
H	10	S	S	P	S	C	-	C
	20	S	P	P	S	C	-	C
	30	S	S	S	S	C	-	C

* Emulsions prepared with 48% Oil and 7.25% Emulsifying Agents
** 24 hour cycle of freezing and thawing for 4 weeks
S Stable Emulsion
P Poor Emulsion
C Phase Separation
·· Phase separation at the end of first cycle

concentration of emulsifying agents was increased to 7.25 percent. These were also divided into three portions and recycled through the two-stage homogenizer for the same periods of time. As with the other series, these emulsions were bottled and stored under various conditions.

Effect of length of homogenization on interfacial area

In order to determine what effect the length of homogenization had on all the emulsions, size frequency analyses were conducted. The analyses were performed in each case after 24 hours of storage at room temperature.

The procedure used to conduct the analyses was as follows:

The diameters of the oil globules in the emulsion were estimated by using a microscope with a standardized ocular micrometer. Before determining the particle diameters, the ocular micrometer was standardized so that one space in the eye piece was equal to 1.500 micons. This standardization was further verified by photomicrographic techniques.

Emulsion samples were diluted to 1:1000 with a solution composed of 50 percent v/v of propylene glycol in water. One drop of each dilution was placed on a hemocytometer having a depth of 0.1 mm. and the sizes of the particles were estimated under the microscope.

In all analyses, approximately one thousand particles were counted and graded into size frequency groups having boundaries of 0-1.5, 1.5-3.0, 3.0-4.5, 4.5-6.0, 6.0-7.5 and 8.0-9.5 microns. All particles having diameters falling within each size group were listed as having an average diameter equal to the midpoint of the class. The size frequency data are included in Tables IV and V.

From the information in the tables, the total interfacial area was calculated for one globule in each size class. These values were then multiplied by the frequency of globules appearing in each group. The total volume and total interfacial area of all the particles (approximately 1000) were then determined by adding the values from each class group.

Table VI shows the calculated values for the total interfacial area adjusted to a total volume of oil equal to one ml.

TABLE IX. Effect of Storage on Specific Interfacial Area ($cm^2 \times 10^4$) of Emulsions C and E (Room Temperature)

Formula		Containing 4.75% of Total Emulsifying Agents Time (minutes)*			Containing 7.25% of Total Emulsifying Agents Time (minutes)*		
		10	20	30	10	20	30
C	24 hours	3.540	3.744	4.390	3.205	3.716	3.352
	1 week	-	-	-	3.127	3.407	3.711
	4 weeks	2.682	2.475	2.870	-	-	-
	8 weeks	1.919	2.388	2.659	2.690	2.030	2.886
E	24 hours	3.563	3.372	3.433	2.817	3.444	3.341
	1 week	-	-	-	2.828	3.015	2.940
	3 weeks	3.204	3.106	2.885	-	-	-
	8 weeks	-	-	-	-	-	2.787
	12 weeks	1.921	1.904	2.372	-	-	-

* Periods of homogenization

Effect of temperature on emulsion stability

Representative samples of the various emulsions were stored at room temperature in the laboratory without any attempt to protect the system from either natural or artificial light. Perodically, the samples were observed and the physical condition of the emulsions noted. The results of this study are summarized in Table VII for the emulsions containing 4.75 percent emulsifying agents, while Table VIII includes the results for the higher concentration of emulsifying agents.

Other samples of emulsions were stored in ovens at a temperature of 50° or 60°C and were likewise

TABLE X. Centrifugation of Emulsions at Several Speeds for 120 Minutes (ml. of sedimentation)

Formula †	4.75% of Emulsifying Agents									7.25% of Emulsifying Agents					
	2000 rpm			2500 rpm			3000 rpm			2000 rpm			2500 rpm		
	10	20	30	10	20	30	10	20	30	10	20	30	10	20	30
A	1.25	1.00	0.50	2.00	1.50	1.00	2.50	2.00	1.50	1.50	2.00	1.00	1.50	3.00	1.50
B	2.00	1.50	1.00	2.50	2.00	1.50	4.00	3.00	2.00	3.50	2.00	1.50	3.50	2.50	1.50
C	1.00	1.00	0.75	2.50	2.00	1.50	4.50	3.50	1.50	3.00	2.25	1.50	3.50	3.00	1.75
D	2.00	1.00	0.75	2.00	1.50	1.25	3.00	2.00	1.50	3.50	2.25	1.50	4.00	2.50	2.00
E	3.00	1.50	1.00	3.50	2.50	1.50	4.50	3.00	2.00	1.75	1.50	1.25	2.00	1.75	1.50
F	2.50	2.00	1.00	5.50	4.00	2.50	6.00	4.00	3.00	2.25	1.50	1.00	2.00	1.75	1.25
G	2.00	1.00	0.50	3.00	2.00	1.25	3.50	2.50	1.50	2.00	1.50	1.00	2.00	2.00	1.25
H	3.50	2.00	1.50	4.00	3.00	2.50	4.50	4.00	3.00	2.25	1.50	1.25	2.50	2.25	2.00

† See Table III for actual formulae
* The figures 10,20 and 30 refer to the number of minutes each emulsion was recycled through the two stage homogenizer
Note: Total volume of emulsion for centrifugation equal to 50 ml.

observed over a period of time. These results are also included in the same tables.

Since Formulas C and E proved to be the most stable emulsions (Tables VII and VIII) when stored at room temperature, size frequency analyses of the oil globules were performed by the method already described. From the accumulated data, specific interfacial areas were calculated (Table IX).

Effect of freezing and thawing on emulsion stability

Emulsions from each series were subjected to 24 hours of freezing followed by 24 hours of thawing. This stress was continued in a cyclic pattern for a period of four weeks. The results of this test are incorporated in Tables VII and VIII.

Effect of Autoclaving on emulsion stability

In this testing procedure, the representative emulsions were diluted with distilled water until the oil concentration was reduced to 15%. Each sample was then thoroughly mixed in a Waring blender for three minutes and placed into a 50 ml. multiple dose vial, capped in the usual manner and autoclaved for a period of 30 minutes at a pressure of 15 lbs. (121°C). All the formulas remained stable after this stress.

Identical emulsions, as depicted in the previous paragraph but containing 4% dextrose, were also autoclaved, but in this instance, phase separation occurred in all the samples.

Effect of pH on emulsion stability

Fifty ml. of each emulsion type was placed into a 100 ml. beaker and either 1.0 N hydrochloric acid or 1.0 N sodium hydroxide solution added until a definite hydrogen ion concentration was reached. Stability of the emulsions was maintained within the pH range of 7 to 9, but as the pH of the dispersion was decreased below 7, practically immediate creaming and phase separation was noted. Above a pH 9.0, phase separation did occur but was not observed until after 24 hours.

Effect of other agents on emulsion stability

In order to detect the influence that other agents might have on the various emulsions, it was decided to include a number of preservatives in all the formulas. Sorbic acid, potassium sorbate, benzoic acid, methylparaben (all in a final concentration of 0.1 percent) were added to 50 ml. aliquots of all the emulsion types (Formulas A to H). These samples were then observed after 24 hours. All emulsions except the one containing the paraben had broken. The sorbic acid and benzoic acid had a more rapid affect upon phase separation than the potassium sorbate, phase separation being noted after 10 hours.

Sodium chloride in a concentration of 1.0% in all the emulsion formulas separated the two phases within a period of 30 minutes. Ethyl alcohol in a concentration of 30% or more destroyed the dispersed system within 24 hours.

Effect of Centrifugation on emulsion stability

Forty ml. of each type of emulsion was centrifuged for a period of 120 minutes at constant speeds from 2000 rpm to 3000 rpm. At the end of the time, the sedimentation was recorded in ml. This information is contained in Table X.

Flow properties

Rheograms for all emulsions were taken in a standardized manner employing a Brookfield Synchroelectric viscometer. Figure 2 shows a plot of the shearing rate (RPM) versus shearing stress (scale reading) of representative samples after 24 hour storage at room temperature. Figure 3 shows the influence the concentration of emulsifying agents has upon the rheology of one system.

Results and discussion

The intent of this study, as has been stated, was to evaluate four Propoxylated sucrose esters as emulsifying agents. Preliminary experiments indicated that these agents should be explored in a more thorough and systematic manner. From these initial exploratory studies, eight basic emulsions were formulated (Table III). One series of these emulsions contained 4.75% of emulsifying agents while the second, 7.25%. In both series, the lipophilic phase constituted 48% by weight of the total formula.

As can be seen from Table III, a pair of emulsify-

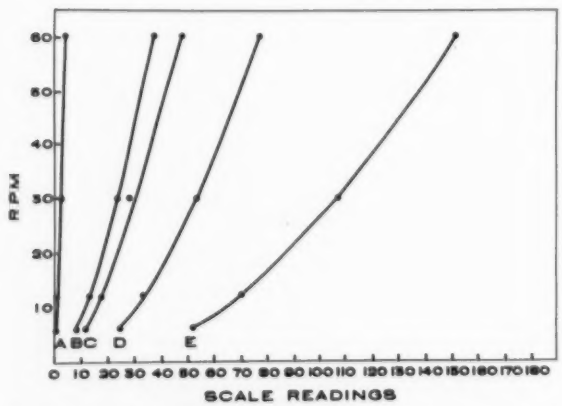


Figure 2—Shearing rate versus shearing stress of representative sample after 24 hour storage at room temperature.

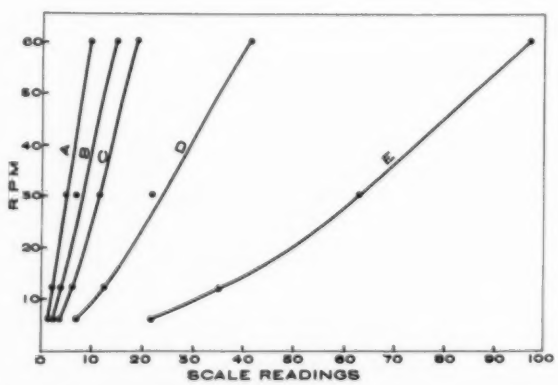


Figure 3—Illustration of the influence concentration of emulsifying agents has upon the rheology of one system.

ing agents was blended for each formula. It should be pointed out, however, that not all the blends produced an HLB recommended for the oil being used. The recommended HLB of cottonseed oil is 7.5, but in the initial exploratory studies, the most satisfactory emulsions with cottonseed oil fell between an HLB of 9 to 10. In the same experiments, the best emulsions for both olive oil and coconut oil have an HLB around 8.8. This did not markedly differ from the recommended HLB (9 to 10) of these two oils. Corn oil on the other hand has an HLB falling between 8 to 9, but the most satisfactory corn oil emulsions fell between the limits of an HLB of 9 to 10. These results are not too surprising since HLB values of the same oil may vary depending upon the source, the emulsifying pairs used to establish the initial HLB value and the method of preparing the emulsion.

The size frequency analyses (Tables IV and V) and the resultant calculated specific interfacial areas for one ml. of oil (Table VI), indicated the effect that homogenization had upon the particle size of the dispersed phase. As may be discerned from Tables IV and V, most of the particles fell under the diameter of 4.5 microns with a few having diameters larger than 5 microns. The calculated interfacial area based upon 1.0 ml. of oil for the emulsions containing 4.75 percent of emulsifying agents appeared not to have any definite relationship to time of homogenization. In contrast, the emulsions containing the higher concentration of emulsifying agents showed that the 20 minute emulsification period produced the largest interfacial area. Further emulsification did not improve the efficiency but rather tended to agglomerate the smaller particles.

At room temperature storage, Formula C (olive oil with HPC mono and tetrastearate) proved to be the most stable (Tables VII and VIII). After 40 weeks, Emulsion C (4.75% emulsifying agents) still indicated complete stability. The other emulsions in the series showed poor stability after eight weeks of storage at room temperature. It is readily apparent that the stability of these emulsions is markedly increased when the concentration of the emulsifying agents was increased to 7.25%.

Storage at higher temperatures (50° or 60°) as might be expected decreased the stability of all the emulsions, the notable exception being the emulsions containing coconut oil (E and F) with 4.75% concentration of emulsifying agents. After eight weeks of storage at 50°C (Table VII), no instability was noted. One explanation for this unusual situation is that coconut oil is very viscous at room temperature and at times tends to solidify. This tendency can impart a strain upon the dispersed system leading to instability. At the elevated temperature, the oil is in a fluid state and no longer exerts a strain upon the dispersion.

Calculation of interfacial areas for Emulsion C and E at room temperature (Table IX) showed the effect of storage on the particle size distribution. In all instances after three or more weeks of storage, the interfacial area decreased (larger particle sizes). This result was to be expected since emulsion systems are thermodynamically unstable systems.

As has been pointed out by many authors, particle size analysis can detect the tendency of an emulsion to become unstable before this fact can be ascertained by gross observation of the emulsion. For example, in this study there would be no indication that there was instability of Emulsion C after 40 weeks of storage at room temperature (Table VII), yet particle size analysis with subsequent calculation of interfacial area did indicate that the emulsion was becoming less stable.

Cyclic periods of freezing and thawing for a period of four weeks produced no visible physical changes in Emulsions A, C and G. Emulsion D did not survive this treatment even for a period of 24 hours, phase separation taking place within that time period. The other emulsions had all cracked by the end of the fourth week (Tables VII and VIII).

All the emulsions proved to be stable to autoclaving when no other additives were included in the formulas. However, in the hope that these emulsions might be useful as intravenous emulsions for their caloric intake, dextrose was included in the formulas. Unfortunately, none of the emulsions remained stable after autoclaving. It should be mentioned here that the inclusion of dextrose without autoclaving produced no ill effect on the emulsion systems. No suitable insight could be envisioned for the incompatibility noted above and further pursuance for an answer was discontinued.

The most stable pH of all the emulsions fell within the narrow range of 7 to 9. Critical effects were noticed practically immediately when the pH was reduced with a mineral acid. Other additives which were organic acids such as benzoic acid and sorbic acid also imparted instability to the emulsion systems, but these adverse effects were not detected until a lapse of 10 hours. Increasing the pH of the systems above 9.0 reduced the stability of all the emulsions but at a much slower rate than in the acid environment.

Initially, it was thought that benzoic acid and sorbic acid contributed to the instability of the emulsion systems because they were being bound by the emulsifying agents. This binding phenomenon, it was further surmised, was altering the surface activity of the HPC, resulting in a decrease of emulsifying properties. That this in itself was not the chief factor contributing to phase separation was borne out by dialysis experiments (not reported in this paper) using HPC monostearate as the macromolecule and benzoic acid, sorbic acid and methylparaben as the micromolecules. All three of the micromolecules were bound to various degrees by the HPC monostearate, but only the emulsion containing the paraben remained stable. This indicated that reduction of pH was probably the main factor in producing phase separation since the methylparaben did not alter the pH, while benzoic acid and sorbic acid can and did.

The sensitivity of all the emulsion systems to electrolytes was very evident. Sodium chloride in a concentration of 1% and even less caused phase separation within 30 minutes, while potassium sorbate showed its influence within 24 hours. Even though no experiments were conducted to determine the sign and magnitude of charge on the particles in the emul-

These Knapp Products...

scientifically developed and produced

ESPECIALLY FOR THE COSMETIC INDUSTRY

invite your investigation

EMULSIFIERS

•

DETERGENTS

•

ABSORPTION BASES

•

FRAGRANCES

•

When you specify any of these Knapp Products, be sure to take advantage of the consultation service provided—to assure their ideal performance in your cosmetic formulations.

KNAPP COSMETIC CHEMICALS

KNAPP PRODUCTS, INC.

LODI, NEW JERSEY

Phone: PRescott 9-6945

sion, it would appear that the zeta potential of the particles was contributing to the stability of the dispersed system; the reduction of this charge by the addition of a small quantity of an electrolyte apparently enhanced agglomeration of the oil globules until phase separation was complete.

Cetrifuging has been utilized to predict the stability of emulsion systems. In some instances, the results are quite useful and do show which emulsion, in a series, will remain stable for the longest period of time. Other predictions based upon the results obtained by centrifuging fall quite short of the actual results.

Since the results in these studies (Table X) were not very conclusive, the data could not be used to predict long range stability. It was evident, however, that in nearly all instances, those emulsions which were homogenized for a period of 30 minutes produced the least sedimentation. The centrifugal force exerted on all the emulsions caused, in a number of instances, greater sedimentation in those emulsions containing the oleates as the emulsifying agents. Part of this behavior may be explained on the basis that the emulsions containing the oleates were less viscous than those containing the stearate esters. No correlation could be made between particle size distribution, shelf life and the results obtained from the centrifuging studies.

The rheological properties of all the emulsions, having an oil concentration of nearly 50% could be defined either as a pseudo plastic or plastic flow. Exact delineation was not possible as can be seen from Figure 2. Lower rates of shear are needed which were not possible with the Brookfield Viscometer. Newtonian flow developed when the oil concentration was reduced to 15%.

Figure 3 shows how an increase in concentration of the emulsifying agents causes an increase in the viscosity of the system.

Summary and conclusion

1. Four esters of Propoxylated sucrose (HPC) were evaluated as emulsifying agents. These were: Monostearate, Tetrastearate, Oleate, Tetraoleate.

2. Various emulsions were prepared using a blend of (1) Monostearate and tetraoleate esters HPC and (2) Monooleate and tetraoleate esters HPC with four oils (cottonseed, olive, coconut and corn). These emulsion systems were subjected to a variety of stress conditions in order to evaluate the stability of each emulsion.

3. The results of the study indicated that even though excellent emulsions could be formulated with the oils, the HPC compounds were very sensitive to additives and consequently their use had disadvantages over existing nonionic emulsifying agents from the point of view of stability.

4. Still to be resolved is the instability of the HPC compounds to salts and pH changes.

References

1. U. S. 2,927,918 A. W. Anderson to The Dow Chemical Company, March 8, 1960.
2. U. S. 2,908,681 A. W. Anderson and J. L. Melstad to The Dow Chemical Company, October 13, 1959.
3. Lambert, G. F., Miller, J. P. and Frost, D. V., **J. Am. Pharm. Assoc.**, (Sci. Ed.), **45**, 685 (1956).

Colloidal Solutions of Lanolin in Oils

BY RACHEL C. HEALD
Schimmel & Co., Inc.

THE SIMPLEST PREPARATION OF LANOLIN for use on the skin is a solution in mineral oil or a vegetable oil. Lanolin is essentially an oil-soluble material and an oily vehicle is effective for cutting the tackiness which is characteristic of wool wax. Clear solutions of lanolin in oils at a concentration of 1-3% are easily prepared and are quite stable. A little sediment may form on long standing or at low temperatures, but this can be prevented by chilling the solutions and filtering before they are bottled. More concentrated oil solutions are cloudy. The cloudiness would not be objectionable if the solutions remained homogeneous on aging. However, they tend to form a sediment or separate into layers so they do not have the attractive appearance which is required of cosmetic products.

Lanolin is a complex mixture of cholesterol esters and other esters of high molecular weight. A small portion of the mixture consists of high melting waxy esters which are insoluble in mineral oil at room temperature. When lanolin is dissolved in mineral oil, this insoluble material causes turbidity. If the concentration of lanolin is 10% or more, a semi-opaque lotion is formed. Blends of lanolin and mineral oil in which the lanolin content is 20-30% have a thick consistency. The high viscosity helps to stabilize the suspension of waxy material but the lotion does not spread very easily on the skin. At cool temperatures it may not be pourable.

Around ten years ago, the producers of lanolin started commercial production of a liquid, oil-soluble fraction of lanolin. In one method of preparation, the liquid esters of lanolin are separated from the high melting waxy esters by vacuum distillation. In another method, the poorly soluble fraction of lanolin is removed by fractional crystallization from organic solvents. The "de-waxed" lanolin is soluble in all proportions in mineral oil, castor oil and other vegetable oils. Concentrated solutions are fluid and free from stickiness. Thus there is no longer any problem in preparing *transparent* oily lotions having a high content of lanolin.

Not long before the oil-soluble liquid lanolin was introduced, a stabilized cloudy lanolin lotion was placed on the market. This anhydrous oily lotion was a translucent golden liquid, distinct from the usual transparent lotions or opaque emulsions. It was fully as attractive to the eye as a brilliantly clear lotion and had the appeal of novelty. This product contained whole lanolin in a high concentration rather than an oil-soluble fraction of lanolin. The lotion was a huge commercial success and was flattered by many attempts to imitate it.

Isopropyl palmitate

A patent covering the cloudy lanolin lotion was granted to Verblen [1] in 1950. It disclosed that the main vehicle for the lanolin was isopropyl palmitate. This ester is a liquid of very low viscosity which is a good solvent for the oil-soluble portion of lanolin. Concentrated solutions of lanolin in isopropyl palmitate are cloudy and have a greater tendency to separate than similar solutions in mineral oil because of the low viscosity. The patented lotion contains 2% of

waxes, e.g. spermaceti or cetyl alcohol, to increase the viscosity.

The specific composition which is claimed consists of 35 parts of lanolin, 53 parts of isopropyl palmitate, 10 parts of refined mineral oil and 2 parts of waxes. The lanolin and waxes are dissolved in the isopropyl palmitate at a temperature of 50°C. The temperature is allowed to drop to 45° and the mineral oil is then added. The resulting solution is rapidly refrigerated to 30°. The rapid cooling has the effect of partially jelling the solution and increasing the clarity to a maximum.

In this preparation, the insoluble fraction of lanolin is in the form of a colloidal dispersion rather than a suspension of larger particles. There is little tendency for the colloidal material to settle and the cloudy lotion remains homogeneous for a long time. Although the solution contains 35% of lanolin it has a fluid consistency and spreads very easily on the skin. The lotion is not excessively oily, as isopropyl palmitate is absorbed by the skin more readily than mineral oil.

Oleyl alcohol

Martini[2] found that oleyl alcohol is useful for preparing oily lotions having a high content of lanolin. Solutions of lanolin in oleyl alcohol have a liquid consistency when the concentration of lanolin is as high as 50% to 60%. Martini's patent covers a cosmetic which is liquid at room temperature, comprising lanolin in an amount ranging from 20% to 60% by weight, oleyl alcohol in an amount greater than 10% by weight, with mineral oil or a vegetable oil forming the remainder, except for small additions of perfume oil and antioxidant.

It is interesting to compare this composition at a lanolin content of 35% with the Verblen composition given above. A blend of lanolin (35 parts), oleyl alcohol (12 parts) and mineral oil (53 parts) looks about the same as the Verblen product. It is translucent and has a partially jelled structure. The lotion is a little more viscous than the one made with isopropyl palmitate. Two examples from the Martini patent are given below.

	I	II
Lanolin	25.0	45.0
Oleyl alcohol	10.0	20.0
Antioxidant (Sustane)	0.05	0.05
Perfume oil	0.4	0.4
Mineral oil	64.55	34.55

Butanol polypropylene glycol ethers

Another version of the stable colloidal solution of lanolin in an oily medium was patented by Kass[3] in 1958. In this version, the vehicle for the lanolin is a mixture of mineral oil and a liquid polypropylene glycol ether of butanol. Examples of butanol ethers which are useful in the lanolin solutions are the compounds sold under the trade names Ucon LB 135 and Ucon LB 385.* The butoxy ethers and diethers of polypropylene glycol are oil-soluble materials. They do not form stable colloidal systems with lanolin alone, but require the addition of mineral oil to produce stable solutions. The only advantage claimed for the Ucon fluids in comparison with isopropyl palmitate is that they are somewhat less expensive.

The lotions preferably contain from 20% to 35% of lanolin and from 10% to 40% of a polypropylene glycol ether of butanol. Light mineral oil may be substituted for the high-viscosity oil in the composition below without affecting the stability of the system.

Lanolin	**30**
Ucon LB 135*	**25**
High-viscosity mineral oil	**45**

Mix the lanolin with Ucon LB 135 and heat to 120° F. A clear liquid results. Add the mineral oil and stir the mixture until a temperature of 75-80° F. is reached. The product is a semi-opaque liquid having excellent stability. (The Ucon number represents the viscosity in Saybolt Universal seconds at 100° F.)

Lanolin derivative esters

A concentrated colloidal suspension of lanolin is now commercially available for the preparation of stable oily lotions of high lanolin content. The product, known as Lanosol,** is a golden yellow translucent liquid of thick consistency. It contains 58-60% of lanolin and 40-42% of liquid "lanolin derivative esters"[4]. These esters are possibly the products resulting from partial transesterification of lanolin with isopropyl alcohol. The colloidal preparation is extremely stable, showing no separation or sedimentation after being subjected to centrifugal force equal to 400 times the force of gravity for one hour.

Colloidal dispersions

Colloidal dispersions are obtained by mechanically mixing Lanosol with mineral oil. Such mixtures remain stable providing their Lanosol content is above 50% or below 15% by weight. A mixture of 55 parts Lanosol and 45 parts mineral oil forms a stable lotion containing 33% of lanolin in colloidal suspension. Best results are obtained using mineral oils of high viscosity.

Patent study a must

Anyone interested in marketing a colloidal anhydrous lanolin lotion must make a careful study of the patents which have been mentioned as well as other patents related to the subject, in order to avoid possible infringement. The claims of the original Verblen patent are limited to isopropyl palmitate as the vehicle for the lanolin. However, the general description of the invention covers esters of low molecular weight alcohols with any of the fatty acids from C_{12} to C_{19}. This would include isopropyl myristate, isopropyl stearate, etc. There is no doubt that the isopropyl fatty esters have a great advantage over most other oils as vehicles for lanolin because they yield highly fluid lotions which spread very easily on the skin.

* *Union Carbide & Carbon Corp., New York 17, N. Y.*
** *Robinson, Wagner Company, Inc., New York 17, N. Y.*

References

1. U. S. 2,498,727, J. R. Verblen, Feb. 1950.
2. U. S. 2,661,316, H. A. Martini, Dec. 1953.
3. U. S. 2,840,509, G. S. Kass, June 1958.
4. Lanosol. Product Bulletin no. 48, Robinson, Wagner Co., Inc., New York 17, N. Y.

Improvements in or Relating to the Stabilization of Hydrogen Peroxide

HYDROGEN PEROXIDE in the highly purified state is a substance having a fairly high degree of stability. Thus, it has been estimated that the loss of active oxygen from 90% pure hydrogen peroxide is approximately 0.5% per year at temperature of 30°C.

It is a quite different matter in practice when hydrogen peroxide is in contact with surfaces, which may or may not be metallic, and with traces of mineral or organic impurities. These traces of impurities have a catalytic action on the decomposition of hydrogen peroxide and, since the decomposition itself is exothermic, still further accelerate the decomposition reaction.

The uncontrolled decomposition of hydrogen peroxide clearly involves serious disadvantages. Firstly, solutions in stock gradually lose their strength, and therefore their commercial value; and secondly, when the hydrogen peroxide is put into use, the decomposition liberates molecular oxygen, and a large part of the active oxygen is lost.

Molecular oxygen injures fibers

In particular, a very large quantity of hydrogen peroxide is used in the bleaching of textile fibers. It is known that the molecular oxygen which is liberated by the spontaneous decomposition of hydrogen peroxide, even if it has virtually no decolorizing action, is nevertheless injurious to the majority of textile fibers. In particular, cellulosic fibers are partially converted into oxycellulose, and lose a great part of their mechanical properties.

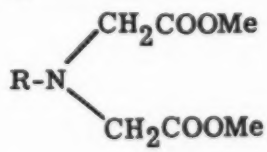
It is very difficult to use hydrogen peroxide industrially under conditions which completely avoid spontaneous decomposition. Thus, it is impossible to avoid the presence of metallic impurities in the hydrogen peroxide, which are contributed by the receptacles, the water used, the articles being treated and the other reagents coming into contact therewith.

In addition, hydrogen peroxide is more stable at low temperatures and in a slightly acid medium; but these are also the conditions under which bleaching treatments cannot be carried out. In fact, textile articles, for example, are always bleached at elevated temperatures and usually in the presence of an alkaline agent which simultaneously tends to swell and clean the fibers.

Thus, the general form in which the problem arises is that of employing hydrogen peroxide under conditions which tend to cause the desired oxidizing reaction, while limiting as far as possible undesired decomposition into molecular oxygen and water.

A certain number of products are known for their stabilizing action on hydrogen peroxide under conditions of use; for example, sodium silicate, sodium stannate, hydroxy-8-quinoline, alkali metal pyrophosphates, and methyl p-hydroxybenzoate. It has been suggested that these compounds act as stabilizers because they are capable of complexing to a greater or lesser degree traces of metals which act as decomposition catalysts.

It is also known that alkali metal aminodiacetates having the general formula:



(1)

(wherein R is an aliphatic or aromatic radical containing oxygen, sulphur, nitrogen or carboxyl groups which latter may or may not be satisfied, and Me is an alkali metal) have a marked complexing power in a neutral or alkaline aqueous media over a large range of temperatures with respect to heavy metals which

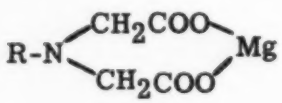
British Patent Specification 852,102, Published Oct. 26, 1960. Societe de Produits Chimiques et de Synthese

are capable of causing the catalytic decomposition of hydrogen peroxide.

These alkali metal aminodiacetates, especially the sodium salt of ethylenediaminetetraacetic acid (E.D.T.A.), have been tested as stabilizers for hydrogen peroxide with contradictory results: a slight stabilizing action was observed in the case of dilute solutions of hydrogen peroxide, but on the other hand these alkali metal salts exhibited a decomposition-accelerating action in the case of more concentrated solutions.

We have now found, most surprisingly, that the magnesium salts of these aminopolycarboxylic acids have a very great stabilizing action on hydrogen peroxide.

These magnesium salts have the following general formula:



(II)

wherein R has the above-stated meaning. However, it must be mentioned that if there are any carboxyl groups in the radical R in the salts used in accordance with the invention, the said groups, if salified, are only salified with magnesium.

This stabilizing effect is unexpected, not only because it is not related to the complexing phenomenon known with the alkali metal salts of aminopolycarboxylic acids, as stated above, but also because it is not a special case of the stabilizing effect of magnesium salts in general. In fact, the salts used in the process according to the invention have a very much greater stabilizing action than other magnesium salts which have been tested for the stabilization of hydrogen peroxide. In addition, certain mixed magnesium-alkali metal salts of the same aminopolycarboxylic acids have been tested by way of comparison and have always given greatly inferior results to those obtained with salts containing only magnesium.

Among the magnesium salts which are suitable for carrying out the process of the present invention, the following may be mentioned by way of example:

di-magnesium salt of ethylenediaminetetraacetic acid,

sesqui-magnesium salt of nitrilo-triacetic acid,

sesqui-magnesium salt of hydroxyethylethylenediamine-triacetic acid,

the magnesium salts in which 3, 4 or 5 carboxyl groups of diethylene-triaminepentaacetic acid are neutralized by magnesium,

neutral magnesium salt of anthranilic-NN-diacetic acid,

mono-magnesium salt of hydroxyethyliminodiacetic acid.

This new process of stabilizing hydrogen peroxide is of very general application and its practical employment lends itself easily to particular conditions of storage or use of hydrogen peroxide solutions.

Thus, the optimum quantity of magnesium salt to be introduced into the solution will depend on the prevailing temperature, on the dilution and alkalinity of the solution, and on the concentration of impurities which tend to cause the decomposition of hydrogen peroxide in the solution. In general, a concentration of from 0.1 to 5 gms. of magnesium salt per liter of hydrogen peroxide solution will give the maximum stabilizing effect.

In order that the invention may be more fully understood, the following example is given by way of illustration only, in this example sodium silicate, which has been established by experience as a stabilizer for use in industrial bleaching baths, has been taken as a typical reference product.

Example

A solution of hydrogen peroxide in distilled water having a concentration of 1.5 volumes of H_2O_2 (that is to say, a solution which is capable of liberating 1.5 times its volume of oxygen by integral decomposition) was prepared. The concentration of hydrogen peroxide in the solution was determined during the tests by taking off 10 c.c. of solution and titrating it with a solution of sodium hyposulphite (in accordance with the known method). The concentration, in these tests, is expressed in c.c.s. of N/10 sodium hyposulphite required to combine with the hydrogen peroxide present in the 10 c.c.s. of solution. Caustic soda was added to the 1.5-volume solution of H_2O_2 at the rate of 1 gm./liter, so as to produce the conditions which prevail in bleaching baths in practice.

Four comparative tests were made, 5 gms/liter of sodium silicate, which is a conventional stabilizer for hydrogen peroxide, 0.5 gm./liter of the tetrasodium salt of ethylenediaminetetraacetic acid (E.D.T.A.—4Na), 0.5 gm./liter of mono-magnesium di-sodium salt of E.D.T.A. (E.D.T.A.—Mg-2Na) and 0.5 gm./liter of di-magnesium salt of E.D.T.A. (EDTA.—2 Mg) being respectively introduced into the solution containing the aforesaid amount of NaOH. A solution without any stabilizing agent (1.5-volume hydrogen peroxide + 1 gm./liter of NaOH) was also examined as a control.

The various solutions were simultaneously heated for two hours at 60°C., then for two hours at 80°, and finally for two hours at 98°.

The comparative concentrations are summarized in the following table:

Stabilizer	Concentration, expressed in ccs. of N/10 $Na_2S_2O_3$ required to combine with 10 ccs. of solution			
	At Start	2 hrs. at 60°	2 hrs. at 80°	2 hrs. at 98°
Control	30.7	24.1	13.1	1.9
EDTA — 4 Na	30.7	13.9	0.4	0.3
EDTA — 2 Na — Mg	30.7	7.0	5.8	4.9
EDTA — 2 Mg	30.7	24.9	23.5	20.1
Na silicate	30.7	21.3	8.4	1.5

These results show the great superiority of the stabilizing effect of E. D. T. A. -2Mg. It will also be observed that those salts which contribute additional alkalinity enhanced the decomposition of the hydrogen peroxide. Sodium silicate, which is the conventional stabilizer in the bleaching industry, is inactive, but its protective action becomes evident in the presence of woven material.

The Problem Of Communication

BY WARREN SCHULTZ, Vice-President
Technical-Industrial Communications
Miles-Samuelson, Inc., New York City

ANYONE WHO HAS OCCASION TO READ, even cursorily, much of the published and unpublished material which is supposed to report on scientific developments, cannot help but be appalled by the frequent lack of communication. Being in the writing business, I am perhaps too much aware of shortcomings in this field. But scarcely a day goes by that I do not see some piece of writing that amazes me with its lack of clarity.

How often have you finished reading a report originating in your own organization, or a technical paper in one of the journals, and then wondered what the writer *really* wanted you to know or to do about it? Or how many times have you asked for a market report from your sales organization, and then when you have received it, decided to act on your own appraisal of the situation, because the report was entirely too inconclusive to be of any help? These are the problems that are today besetting management in the cosmetics industry, and in fact, in all types of technical manufacturing.

What it all boils down to is communication—or better, the lack of it.

How do we communicate?

Human beings of course communicate chiefly through the use of words. While this is a somewhat circumscribing requirement, it seems to be inescapable. And it is remarkable that we do manage to convey meaning to one another after all, even though the same word does not always mean the same thing to different people.

The problem is not so acute in the field of spoken communication. There we are not quite so dependent upon words. We use words in speaking, but we also have available other tools: gestures, pauses, emphasis. We prefer not thinking of ourselves as addicted to the use of gestures; Americans are heir to the Anglo-Saxon heritage of unemotional understatement. But the shrug of the shoulder, the lifted eyebrow, the shake or nod of the head, are all used in conjunction with the spoken word, to supplement the effect of the words themselves. The pregnant pause, the emphasis too subtle to be conveyed by italics, also are important parts of our oral communication. And so our *listener* does not have half as much trouble understanding what we want him to do as our *reader* does.

In writing, we do not have the advantages of these non-verbal helps to communication. We must depend on inanimate printed words to convey our thoughts and emotions. Because of the need for a permanent record, much of our business communication must be in writing. It therefore, behooves us to develop our skills, and those of our employees, to the point where we make maximum use of the written word.

Writing has four functions: description, narration, exposition, or persuasion (some classifiers call this last

function "argument"; but this title has an undesirable connotation). The same classification holds true in scientific writing whether it concerns cosmetics or nuclear energy; and in scientific writing I include everything from highly technical intra-company reports to the popularized treatments of scientific subjects that fill our mass magazines and newspapers every day.

Of these four functions, perhaps the most important in business communication is persuasion. Some persons may feel that persuasion has no place in factual reporting; that there are many instances where no persuasion should be intended. But in my opinion, there is no reason to write the report, paper, or article if there is no attempt (if only indirect) at persuasion. In order to have any degree of success in his avowed purpose, the author must feel that he has something important to say (neglecting the rare case where he has been pressured into publishing by his employer) and he certainly wishes to persuade his readers that what he has to say is true, and should be acted upon.

It is precisely in this function of persuasion that so much of our day-to-day writing falls short. The manager who receives a report on a new development from the laboratory wants to be told—to be persuaded—that this action or the other is the proper one to take. Naturally, he wants to know the considerations that led the author to this recommendation, and if he disagrees, he may decide to follow another course. But the successful executive must, in this day of extremely complex technology, be able to depend upon his subordinates for guidance in making important decisions.

Where does the trouble lie?

Having established that modern technical writing suffers from a lack of communication, the first questions that one tends to ask himself is, "How universal is the problem? Is it more prevalent among the junior men in industry or among the senior men?" And the answer, of course, is that it is extremely prevalent, and that there is no particular group that is worse than the other. The reasons for lack of success are different, but both groups suffer from an inability to get their message across to the reader.

What's wrong with the recent college graduate?

It has been said time and again by those far more qualified to speak on the subject than I, that modern technical education is too much technical and too little education. The scientist or engineer who is graduated by one of our many fine technical schools many times is sadly lacking in the broad liberal areas of education. Colleges are concentrating the majority of their curriculum time on the technical courses, and I'm afraid that we have not convinced the technical student of the advantages to be gained by applying himself to such subjects as English, psychology, and the like, as opposed to the strictly technical subjects.

This, I am convinced, is not wholly the fault of the student or of the educational institutions. American industry is primarily to blame. Many firms have convinced themselves, and wrongly so, that what they need in a graduate engineer or scientist is a man who can come in on Monday morning, roll up his sleeves, and start right out doing a productive job. This means that the college must give him, during his four or five years of residence, not only education, but also training. And training is not really the function of the educational institution.

Training should be supplied by industry itself. Some industries, and some individual companies, have realized their obligation, and have instituted comprehensive training and indoctrination programs, some lasting as long as nine to twelve months. But unfortunately many of the programs that masquerade under the name of training are really only an extension of the testing and hiring program. The man is merely shifted from one department to another, according to some prearranged plan (or sometimes not so prearranged), and various supervisors are given the chance to look him over, until one decides that he likes him, at which time the "training" ends, and the man goes to work.

Under an ideal system, colleges and universities would perform the function for which they are so ideally fitted, that of providing their students with an education. Included in this broad fundamental education should certainly be an increased emphasis on writing. Nothing is more important to the technical man in industry (or to any other man, for that matter) than the ability to communicate succinctly his ideas to others.

What does it profit our young engineer or scientist if he discovers the most important secret in the world, and can't tell anybody about it! The old saw about building a better mousetrap and the world beating a path to your door is not very applicable these days. If you, as the employee of a large (or even small) corporation, invent a better mousetrap, or create a better hand lotion, you had better be able to tell someone about it in such a way that you can convince him it really is better. Otherwise you will find the promotion, and the year-end bonus, going to the man down the hall who came up with a product that wasn't quite so good but sounded better in the report he wrote.

Why can't the older employee communicate?

The younger members of our technical staffs do have one quality in their favor though—you may call it brashness. A certain degree of self-confidence in the young is a valuable thing; let's not discourage it. At least in so far as it comes through into his writing, it helps the reader to form an opinion of just what it is that the author wants him to do.

Too often, when a man has worked for a large corporation for a long time, he has had all the "brashness" bred out of him. His motto then becomes "Don't stick your neck out." He feels that if he can just sit on the fence in every controversial situation, and keep everyone happy, he can last it out until his retirement. In the great internecine wars of office and laboratory politics he may be able to be on the winner's side no matter who the winner is. And this attitude is reflected in his writing. He never takes a firm stand; he never recommends; he presents the facts in such a way that no matter what final action is taken, he is not proved wrong. His reports and

published material, therefore, leave the reader as much up in the air as he was before he read them.

At this point, you are saying to yourself that I am guilty of the same crime that I have spent all this time berating. I have merely pointed out a number of problems in technical communication, and have suggested no solution. And you are right.

The problem is so complex, and there are so many different companies with such varying organizations, that it is difficult to propose a panacea. It seems obvious that companies should institute programs and create an atmosphere conducive to the development of writing skills. But this is a long-term solution. What do we do to correct the situation immediately?

What's the solution?

There are at least two different short-term solutions to the problem, and I present them here for your evaluation in light of your own needs.

1. The creation, within the company, of a Technical Editor. His function would be to review and edit all manuscripts for publication, to assist in the preparation of internal reports, and in general to act as a consultant on technical communication to any department or employee. He should be a man skilled in writing, and in editing for they are two different fields. His salary could be paid by, and he could be attached to, any one of a number of departments, such as Public Relations, Research, Advertising, or Industrial Relations. In order to be effective, he must have enough authority for his recommendations to carry weight. He would probably have to come from outside the present organization, although you may have a man with the necessary background who is now performing some other function.

2. The establishment of a relationship with an outside agency who can offer the needed services: writing, editing, consultation. There are a number of excellent companies, who are thoroughly competent in technical writing and editing, and who can perform a definite service in improving the internal and external communications of most industrial firms. This includes the editing of internal reports, preparation of technical papers and articles for publication, speech writing for executive personnel, and technical advertising and sales promotion.

The choice between these two alternatives depends on the amount and the distribution of the work. A company's own editing staff has certain advantages on internal work, but has the disadvantage of being neither expandable in periods of peak demand for their services, nor contractable in slack periods. The advantage of using an outside agency is that you pay for their services only to the extent you use them, and you always have available a selection from a large group of writers and editors with different skills and backgrounds.

As technology grows increasingly complex, the need for effective written communication becomes correspondingly acute. Probably we all recognize this need, but few of us are taking positive steps to overcome the present deficiencies, much less to prevent a frightful squandering of good ideas, because we just aren't able to tell the right people about them.

Find cause and remedy for aerosol container corrosion

The assumption that aerosol container corrosion was caused by hydrolysis of propellent and the resultant liberation of acid has recently been disproved. Research has established that the major cause of the corrosive action is hydrochloric acid formed in a free-radical reaction between the propellent and ethyl alcohol.

Thus technical personnel at Du Pont began looking into methods of stabilizing alcohol-based aerosol products to prevent the reaction with propellent 11 from taking place.

Approximately 300 compounds were tested in the course of screening potential inhibitors, since it was necessary to select those that were colorless, odorless, volatile, non toxic and having no harmful side effects.

The compounds were tested initially at a level of ½% in a mixture of propellent 11 and ethyl alcohol. Containers were stored at 194°F for 24 hours. Those compounds passing the screening test were subjected to extended storage at 100°F. After many evaluations the choice was nitromethane as the material best meeting all requirements.

On the basis of this work, Du Pont's new "Freon-11" S contains 3/10 of 1% nitromethane. Except for the addition of the inhibitor, the new product has properties identical to "Freon-11".

Storage tests showed that well-purged uninhibited hair spray formulations can be expected to have a 60% failure rate within two months because objectionable odors develop. When nitromethane was added, no failures were observed after eight months' storage. All aerosol formulations tested by the company to date have been compatible with the new stabilized propellent.

Other aerosol products using simple alcohols, such as room deodorants, were tested and in every case nitromethane was found to improve shelf-life with no undesirable side effects. Toxicological studies also have established that the "Freon-11" S has the same low level of toxicity as "Freon-11".

Advantage of nitromethane stabilizer in controlling container corrosion is shown in these photographs of two aerosol cans which have been cut apart to show interiors separately from tops. Both cans were filled with an alcohol-propellent 11 mixture and subjected to the same tests. The can on the left contained uninhibited "Freon-11" propellent, while the one on the right contained "Freon-11" S propellent stabilized with nitromethane.

Physiological and Biochemical Changes of the Aging Skin

BY IRWIN I. LUBOWE, M.D., F.A.C.A.*

AGING HAS BEEN DESCRIBED as a biological phenomenon which is common to all living organisms. A number of speculative hypotheses have been presented for theories of aging. These theories fall into two major groups: one, aging is an inherent property of living matter, and two, aging is the result of disturbances in specific physiological systems, particularly the hormonal.

Recently there have been popularized attempts to reduce the rapidity of aging by use of novocaine parenterally and injections of both living and desiccated animal extracts. The passage of time will demonstrate the effectiveness of the aforementioned speculative modalities. Interestingly, in spite of the fact that physiological processes diminish in intensity, laboratory investigations have revealed that the acid base equilibrium of the blood and the fasting arterial blood sugar do not change systemically with age.

Other constitutional factors that do not change with age are the eosinophile response of the blood to the intramuscular injection of ACTH; also the nitrogen retention is similar in the old and the young when increased amounts of protein are offered in the diet.

However, on the other hand, there are a number of physiological functions which demonstrate diminution with age differences. The renal plasma flow and the glomerular filtration rate are altered. There is a gradual fall in the basal metabolic rate in the aging group. The above alteration of the normal processes demonstrates that although not all physiological processes show a lessening with age, the changes in the skin are naturally more evident because they occur on the exposed parts of the body.

As the individual becomes older, certain specific

*Assistant Professor of Dermatology, New York Medical College-Metropolitan Hospital Center, Dr. Joseph L. Morse, Chairman; Associate Dermatologist, Metropolitan Hospital; Assistant Dermatologist, Flower and Fifth Avenue Hospital.

Presented at the International Symposium of The French Society of Cosmetic Chemists, October 30, 1960.

changes are noted in the external appearance of the skin which are simultaneously taking place with the internal aspects of the epidermis and cutaneous tissues. The skin loses its elasticity and flexibility to become thin and non-elastic with subsequent development and accumulation of lines. In the female there is accentuation of the lanugo hairs with increased evidence of a fuzz. Occasionally one sees the appearance of a moustache and the longer hairs of the cheek and the neck, when, unfortunately, the scalp hair demonstrates thinning and, at the same time, the diffuse type of alopecia is becoming more widespread.

Hyperpigmentation

There also begins to appear in the fourth, fifth and sixth decades, areas of hyperpigmentation and verrucous growths commonly called seborrheic keratoses. If these lesions demonstrate malignant changes, they are described as senile keratoses. It is difficult to make a diagnosis from superficial observation, and histological study is essential to make a specific micro-cutaneous diagnosis.

Frequently in the same age group, due to constant exposure to the actinic rays, more permanent and drastic damage may result in the formation of thickened skin, accentuation of the cutaneous lines and formation of many new growths. These growths are usually basal cell epitheliomas or squamous cell epitheliomas. The common term utilized for the production of skin changes due to constant and continuous exposure to the sun, is "farmer's" or "sailor's" skin.

The loss of elasticity of the skin which is due to relative thinning of the tissues of the dermis and subcutaneous layers, results in excessive wrinkling changes more frequently on the upper and lower lids with extension to the brow. These accentuated wrinkles are commonly known as "crowsfeet". Frequently, perpendicular wrinkling is noticed on the upper lip, the infra-oral areas and the chin.

Cause of physiological skin changes

The normal physiological changes in the female skin are evidently due to the altered or reduced production of the hormones, namely, estrogen, progesterone and androgen. As the active male and female hormones diminish in secretion, we believe that the normal keratinization of the cutaneous tissues is affected. The processes slow up and, at the same time, diminution of the size and weight of these individual components takes place. Waning hormone production brings about a thinning of the cutaneous tissues, thinning and fragmentation of the collagen fibers, loss of the ground substance and subsequently of the elasticity and, as a result, wrinkling occurs.

The sweat and the pilosebaceous secretions deposited on the surface of the skin aid in lubrication and emolliency. As the individual becomes older, these secretions diminish and associated decrease in hydration and subsequent drying of the skin. The human skin lipids contain:

I. **Free fatty acids:**

- A. Saturated 10%
- B. Unsaturated 20%

II. **Saponifiable material:**

- A. Triglyceryl esters 25%
- B. Other esters of fatty acids 15%

III. **Non-saponifiable material:**

- A. Hydrocarbons:
  - 1. Saturated 8%
  - 2. Unsaturated 5%
- B. Free cholesterol 2-4%
- C. Higher molecular weight alcohol (liquid and solid) 10-15%

An ointment[1] is fabricated from constituents which closely approximate those of the human skin lipids. This ointment is being used as a base in the treatment of many of the inflammatory diseases of the skin.

In an article appearing in the November, 1950 issue of *Geriatrics*, S. A. Klein summarizes many of the physical chemical changes which occur in this age group. The sebaceous glands secrete 1-2 gm. of sebaceous material a day. Chemical analysis of this secretion reveals oleic palmitic stearic cholesterol and inorganic salts, epithelial debris, sweat gland products and water. The sebaceous secretion diminishes in the female commencing with the menopause; the quantity of sebaceous secretion in the male continues without abatement. Rothman has described the disturbed relationship of androgen to estrogen secretion and the associated changes observed in the sebaceous apocine.

Cholesterol content declines

There is a significant decline of the cholesterol content in the aging skin. It is interesting to note that in the fetal skin there is present an average of 1200 mg. of sterol and 100 gms. of desiccated skin. In children the sterols decrease to 500 mgm., and in adults there is a further reduction to about 365 mgm. The hair of children contains 9-12% cholesterol as compared to 1-5% in adults.

These above findings should be further explored relative to the restoration of emolliency of the aging skin by topical cholesterol and sterol replacement. Chemical analysis reveals that the calcium content is increased in the aging skin while there is present only 60% of sulfur in the senile skin as compared to the amount found in the adult.

As the years advance, there is a significant diminution of organic sulfur in the skin as found in cysteine, cystine and methionine. The possible replacement of these methylating compounds by topical unguents and lotions has been studied by dermatologists for many years. The author has combined a new allantoin acetyl methionine complex with estrogen and progesterone hormones to increase the elasticity and youthful appearance of the skin of the menopausal female.

Dermatologists have observed that the graying of the hair occurs earlier in the female, namely between 50 and 60, and in the male between 55 and 65. However, no set rule can be fixed. The pubic and axillary hair thins in the female in the fourth and fifth decade of life, while in the male the scalp hair diminishes in thickness and the body hair thickens. In the male, the external surface of the legs demonstrates alopecial changes. Recently, the author reported thinning of the scalp hair of the female which may be due to external

for Penetration

ACETULAN®

spreading and penetrating emollient...leaves soft after-feel on skin and hair

ACETULAN is a 100% active liquid fraction of acetylated lanolin alcohols with remarkable spreading, penetrating, lubricating and solubility characteristics. This low-viscosity emollient fluid, made by our exclusive process, actually seems to disappear into skin and hair. It imparts persistent hydrophobic films with excellent softening and conditioning properties.

ACETULAN's superior penetrating and emollient properties plus its ability to prevent viscosity changes in emulsions make it an extremely beneficial component of many products. The following illustrate ACETULAN's versatility in various applications:

- spreading agent and emollient for creams, lotions and baby products
- co-solvent and plasticizer for aerosol hair sprays and make-up
- lubricant and compressing aid for talc and powders
- non-volatile solvent for many antiseptics and for sebum in acne preparations
- forms persistent films for sunscreens
- for hypo-allergenic cosmetics and specialties

Complete technical data, samples, and suggested formulas are available from our research laboratories.

Amerchol

AMERICAN CHOLESTEROL PRODUCTS, INC.

Amerchol Park • Edison, New Jersey

causes and not related to waning physiological functioning.

The pigmentary disturbances of the hair, particularly canities, are related to altered function of tyrosine, tyrocinase and organic copper. Also there may be a disturbance of lysine and tryptophane metabolism. Utilization of copper is also dependent upon panthothenic acid participation. Graying of the hair may be helped by internal administration of copper, para aminobenzoic acid and panthothenic acid derivatives.

Trace minerals also play an important part in maintenance of metabolism which affects cutaneous health. Calcium was mentioned previously, and its specific function is in the control of capillary permeability. Copper, as previously mentioned, participates in melanin formation. Magnesium is essential for function of many enzyme systems, specifically carboxylase, phosphatase, and phosphorylases. Magnesium possibly assists in normal keratinization of the skin; zinc is also a factor in the maintenance of normal enzyme systems.

Deficiencies in many of the vitamins, particularly the water soluble vitamins, are known to produce changes in the senescent skin. These basic vitamins are pyroxidine, pantothenic acid, nicotinic acid, biotin, para amino benzoic acid, ascorbic acid and the citrus bioflavinoids. Vitamin K deficiency results in purpura and telangesasia.

Histologic studies demonstrate the thinning of the epidermis, dermis and subcutaneous tissues with thinning and fragmentation of the collagen fibers. Histologic examination of the scalp, particularly in the male, in the fifth and sixth decades, reveals decrease in the size of the sebaceous glands and the hair follicles. In patients that present the pattern type of alopecia, frequently the hair papilla may remain *in situ;* however, the hair follicle and hair shaft, which formerly projected from the papilla, are no longer present. In other cases, there is also demonstration of thinning of the hair shaft and the hair follicle, particularly in the female.

Skin respiration studies have revealed a comparative decrease of the respiration factor of the patients in the fifth and sixth decade of life. Goldschmiedt has conducted tests on baby mouse skin homogenates and has observed, by use of a modified Warburg manometric technique, that topical application of human placenta extract in specific concentrations, pantothenic acid and allantoin acetyl methionate cause increase in skin respiration. These findings require further study and interpretation.

Skin integrity is maintained by normal physiological balance and function which is interdependent of the vitamins, hormones, enzymes, steroids and trace minerals in the body. A deficiency or an altered function of any of the previously mentioned factors may influence the metabolism and thus the appearance of the skin.

The provocative problem exists as to whether the topical application of hormones, steroids, tissue, plant and animal extracts can benefit an aging skin which is produced by alterations and diminution of function of various constitutional systems.

1. Veriderm, Upjohn Co.

Fragrant Flowers and Leaves

Part 2. — *The Acanthaceae*

Part I of Fragrant Flowers and Leaves covered the Apocynaceae (Dog Bane or Periwinkle family). It was published in the April 1961 issue.

BY EDWARD S. MAURER, F.L.S.
W. J. Bush & Co., Ltd., London

THE BEAR'S-FOOT FAMILY, so-named after a fancied resemblance of the leaves of some species, presents an interesting selection of herbaceous plants, trailers, climbers, shrubs and trees. These are mentioned by some writers for the beauty of their foliage rather than their flowers. Others however, mention sundry species of *Justicia, Ruella* and *Aphelandra* which are cultivated in hot-houses for their showy blossoms.

The Family comprises some 150 or so genera, running to well over 2,000 species with a seeming proclivity for Southern and Central Africa, the latter accounting for at least 100 genera and 1,000 species.

There does not appear to be any wild plants indigenous to the British Isles, but there are many endemic to S. America and India which, in my opinion, are worth investigating for their musky floral-herbal redolences.

Acanthus: The generic name is adapted from the Greek *akanthos* meaning a spike, referring to the thistle-like prickly foliage, and of *A.mollis*, whose leaves it is said suggested the idea for decorating the capitals of the Corinthian columns.

In passing, I would remark that one of my most frequently consulted sources of information is the back numbers of the American "National Geographic Magazine," and in the issue for August 1939, there is a 52-page color-illustrated article by E. S. and F. E. Clements dealing with the *Floral garlands of Prairie, Plain and Woodland*.

Of the Acanthus, the authors state that: "There are comparatively few well-known members in this country, since they seem to prefer more tropical climates, where they supply the natives with foods, dyes and drugs." A unique use has been found for a shrubby species in East India, which, when planted in the rice fields, is said to produce a toxic oily film on the water capable of destroying aquatic weeds and low forms of injurious insect life.

Justicia: (Named after J. Justice, a celebrated Scotch horticulturist). There are upwards of 75 species of these showy tropical, white, red, purple and yellow annuals which are related to the genus *Er/anthemum;* the name in Greek signifying *erao*, lovely and *anthos*, a flower, referring to the beauty of the blossoms, of which there are some 60 varieties.

Some idea of the primal redolence of this family may be gleaned from the common names of *J.comata* and *J.hyssopifolia;* these are the Balsam-herbs of Jamaica, while *J.nasuta* and *J.pectoralis* are the Garden Balsams of the East Indies.

Dicliptera: Named from the Greek prefix *dis*, meaning twice and the verb, *kleio*, to shut, referring to the two-celled seed-vessels. There are upwards of a dozen blue, purple and scarlet-flowered South American species, of which *D.Tweediana* is also the Argentina *J.colorada*, the crimson blossoms of which are, oddly enough, shaped like the leaves. Incidentally, these have a sweet balsamic odor.

Rhyti/glossa, in Greek means literally a wrinkled-tongue, alluding to the texture of the leaves. *R.laevingis* is also known as *J.lila*, the blossoms of which resemble those of the common Bee-orchis and emit a sweet melissa balm-like fragrance.

Phlog/acanthus: The Greek word *phlox* means a flame, this is suggested by the intense scarlet-orange color of the several South American species. These are allied to the *Justicia* and are similar in odor.

Adhatoda: This is the name in the vernacular of the Malabar Nut-tree, also known as *Arusa* or *Bakas* and sometimes listed as *Justicia Adhatoda*. The leaves, prepared in various ways, have an excellent reputation in the East for relieving asthma. When dry, they have a scent somewhat like that of Indian tea, but this is much more aromatic and incense-like upon combustion.

Di/anthera: Named from its divided anthers. *D. Americana* is the purple-flowered North American Water-willow, the nature of which is more pronounced in *D.repens*, another of the marshy balsam-herbs.

Hypo/estes: The name is derived from the Greek prefix *hypo*, signifying under, and *estes* = a covering

for Solubilization

SOLULAN®

water and alcohol soluble lanolin derivatives...leave emollient films on skin and hair

THE SOLULANS are 100% active emollient ethoxylated lanolin derivatives. Their unique chemical structure induces solubilization of many otherwise water-insoluble substances and, at the same time, adds valuable conditioning properties to cosmetics and pharmaceuticals. Only the SOLULANS provide this remarkable combination of effects.

Although the SOLULANS are water soluble, they leave persistent emollient films which resist washing away. We have obtained this unusual property by giving them a hydrophobic toe-hold in the shape of lanolin sterols and/or acetyl groups.

SUGGESTED APPLICATIONS

- lotions and creams
- aerosols
- antiperspirants
- shaving preparations
- make-up
- shampoos
- rinses
- cold waves
- hair dyes
- other treatment preparations

Complete technical data, samples, and suggested formulas are available from our research laboratories.

Amerchol

AMERICAN CHOLESTEROL PRODUCTS, INC.

Amerchol Park • Edison, New Jersey

referring to the bracts covering the calyx. There are about a dozen of these white and red-flowered East Indian and Australian plants and of *H.moschata*, it is reported that "The whole plant seems to be pervaded with a singularly penetrating musk-like smell which is powerfully retained even in dried specimens."

Strobil/anthes: *Strobil* is one of the lesser-used Greek terms for a pine-cone, the shape of which is evinced in the blossoms of the half a dozen or so East Indian blue-flowered species, of which *S.viscosus* may be mentioned, for the whole spike of flowers is densely covered with sticky glandular hairs, the brushing against of which, imparts a strong musky odor to the clothes.

Ruellia: (After J. Ruelle, a renowned French botanist). There are upwards of 60 blue-flowered species, of which, *R.tinctoria* is the East Indian Roumplant. This yields a beautiful all-purpose ultramarine blue dyestuff. *R.tuberosa* belongs to the W. Indies where it is variously known as the Jamaica Snapdragon, Menow, Spirit-Weed or Spirit-leaf, reputed to possess some very peculiar psychic properties. The foliage has a strong herbal note which is more pronounced and disagreeable in the Mexican *R.foetida*.

Thunbergia: (Named after C. P. Thunberg, the celebrated Swedish botanist). There are upwards of 25 species of these herbaceous climbers indigenous to South America, South Africa and India. Of these it is noted that the snow-white flowers of *T.fragrans* are odorless, but the leaves and stems have a pleasant aromatic smell. This is incidental to other species.

In a particularly useful source-book, namely "The Flowers and Gardens of Madeira" by Florence and Ella du Cane, (1926) it is said the beautiful winter creepers "*T.laurifolia*, with its bunches of grey-blue Gloxinia-shaped blossoms, cannot be omitted, although the beauty of the plant is somewhat spoiled by the dead blossoms hanging on instead of falling, thus by their brown, shrivelled appearance marring all the freshness of the newly-developed flowers." It is a passing thought that some of these rusty floral residues, for instance, the lilacs and buddleias may hold some latent perfumery interest. Incidentally, *T.alata* (winged) is the familiar dark-centered, orange-colored "Black-eyed Susan," while *T. grandiflora* is the "Blue-sky Flower" of India which has long been eulogized by the native poets.

Miscellaneous genera

Allied to *Justicia* are the *Dicleptera, Porphycoma* and *Beloperone;* to *Ruellia*: *Calophanes, Goldfussia* and *Salpixantha;* to *Barleira*: *Geissomeria* and *Lepidaganthus*, grouped here for future reference as the available data is very meagre.

Summary

This family offers some interesting potential nuances—herbal, melissic, balsamic and musky. Most of the aromatic species are hardy and easy to raise from seed or cuttings which can be obtained from progressive nursery-gardeners, and should prove of interest to the perfumer-cum-botanist.

Distinguished Achievement

IN ART AND DESIGN

The graceful Pont Neuf—Paris.

Perfumes that are destined for long and successful recognition in the market places of the world, are the result of truly creative inspiration plus sound judgment and scientific experience.

These abilities are yours through I.F.F. to help you choose a distinguished fragrance for your new product.

iff

VAN AMERINGEN-HAEBLER • POLAK & SCHWARZ

INTERNATIONAL FLAVORS & FRAGRANCES INC.

521 West 57th St. • New York 19, N. Y.

Creators and Manufacturers of Flavors, Fragrances and Aromatic Chemicals

ARGENTINA AUSTRIA BELGIUM BRAZIL CANADA ENGLAND FRANCE GERMANY HOLLAND ITALY NORWAY SOUTH AFRICA SWEDEN SWITZERLAND U.S.A.

for Unsaturation

POLYLAN®
and
RICILAN®

Unsaturates with Remarkable Penetration and Emollient Effects

POLYLAN and **THE RICILANS** are completely new formulating materials for the cosmetic chemist. They are 100% active glyceride-free liquid waxes with unusual emollient, penetrating and spreading properties.

POLYLAN is the unique polyunsaturated ester of selected lanolin alcohols and the essential fatty acid, linoleic. In POLYLAN a high level of beneficial unsaturation has been achieved (Iodine no. 120) without sacrificing stability.

THE RICILANS are polymeric unsaturated hydroxy esters of selected lanolin alcohol and castor oil components. By balancing hydrophobic and hydrophilic groups, the RICILANS gain valuable new properties, not present in the natural products used as starting materials.

POLYLAN and **RICILAN** add emollient and conditioning effects as well as gloss, color enhancement and a soft waxy after-feel to products such as:

- lipsticks
- aerosols
- creams
- lotions
- hair preparations
- treatment products

Complete technical data, samples, and suggested formulas are available from our research laboratories.

Amerchol
AMERICAN CHOLESTEROL PRODUCTS, INC.
Amerchol Park • Edison, New Jersey

TECHNICAL ABSTRACTS

British 836,694: FOOD FLAVORING—having meat-like flavor, prepared by reacting a pentose or hexose monosaccharide with cysteine.
Unilever Ltd. 4.4.56 as 10328/55, clg. 7.4.55 (GB)

New artificial flavoring substances capable of imparting to foodstuffs a savory taste and smell particularly resembling that of cooked meat are produced by reacting a pentose or hexose monosaccharide with cysteine in the presence of a large excess of water at elevated temp., so that the reaction mixture is not alkaline at the end of the reaction. Preferably a pentose such as ribose, araburose or xylose is used as a hexose such as glucose, in the absence of pentoses, and gives a substance having a pleasant savory taste other than meat unless heating is continued for a longer time.

Best results are obtained with ribose and more full-bodied flavors are obtained by using cysteine mixed with one or more, preferably three or more other amine acids, e.g. glutamin acid, lysine, leucine, a: B-alanine, threonine, histidine, serine, valine or cystine, obtained by hydrolysis of fish protein with HCl or NaOH and removal of phenylalanine and methionine which give undesirable floral or potato-like aroma. Preferred ratio of cysteine to monosaccharide is 0.4: to 2:1 and the amount of water should be at least 5, preferably 15-25 times that of the monosaccharide, although larger amounts (up to 1500 times) may be used, and the pH is not critical but 3-6 is preferred. (9.6.60;A231) D Thru *Organic Patents Bulletin*, 194, Gp.5-P.2, July 1, (1960).

Australian 53195/59: FLAVOR CONSTITUENTS—
Kelly & Associates, Inc. E.J. 29.9.59, clg.13.10.58 (USA) 22pp

Method of separating and isolating odor and flavor constituents of natural fruit and berries from water vapor and non-condensable gases containing a minute quantity of the constituents. Method comprises subjecting a source material (composed of water vapor and non-condensable gases containing a minute quantity of volatile odor and flavor constituents) to a temperature below about 43°C and an absolute pressure of not over 115mm Hg in a condensation zone. Not less than 70% by weight of the water contained in the source material should be condensed, and the condensed water separated from the residual vapors and gases to accentuate the partial pressure of the odor and flavor constituents in the residual vapors and gases. The residual vapors and gases are passed through a series of condensation zones maintained at virtually equal absolute pressure below about 115mm Hg. The temperatures in the zones are maintained at progressively lower levels between about 22°C and 2°C. The condensates from the series of condensation zones are combined to obtain a transparent and virtually colorless, non-oily, liquid composed largely of odor and flavor constituents. (31.3.60) D Thru *Organic Patents Bulletin*, 194, Gp. 5 p. 1 July 1 (1960).

TA

SPRING & SUMMER COLOGNES
There's a bit of a SPRITE in every woman
May we offer new fragrances for your spring and summer colognes. Our perfumers are ready to help you catch the scent of garden and meadow . . . and match the mood of sprite in every woman.
Dodge & Olcott Inc. Seventy-five 9th Avenue, New York 11, New York
sales offices in principal cities our 163rd year of service
D&O ESTABLISHED 1798
fragrances for every occasion

The following papers were presented before the convention of the American Pharmaceutical Association, April 23-28, 1961

Spray Congealing: Particle Size Relationships Using A Centrifugal Wheel Atomizer.
By Morton W. Scott*, Manford J. Robinson, John F. Pauls and Russell J. Lantz. Smith Kline & French Laboratories, Philadelphia, Pa.

Stearic acid-ethyl cellulose mixtures were spray congealed using a specially instrumented Niro laboratory model spray dryer. Thirty-six runs were conducted under varying operating conditions. The variables studied included atomizer wheel speed (11,900 to 43,100 rpm), feed rate (32 to 280 Gm. per minute) and feed viscosity (0.098 to 1,995 poise). Average particle sizes and other parameters of particle size distribution for each congealed product were calculated. The volume-surface mean diameter, d_{vs}, obtained from Micromerograph data is the preferred size parameter for correlation purposes.

The results are correlated by a simple exponential equation in which d_{vs} is proportional to feed viscosity, to feed rate per unit wetted wheel periphery, and to peripheral wheel velocity. The value of the equation for particle size prediction is demonstrated.

*Present address: Warner Lambert Research Institute, Morris Plains, N. J.

Color Stability of Tablet Formulations V. The Effect of Ultraviolet Absorbers on the Photostability of Colored Tablets.
By L. Lachman, T. Urbanyi, S. Weinstein, J. Cooper, and C. J. Swartz. CIBA Pharmaceutical Products Inc., Summit, New Jersey.

The use of an ultraviolet absorber in tablets colored with three dyes representing different chemical types was evaluated for its photostabilizing effect. Two sources of light were employed; one approximating the spectral energy distribution of sunlight and the other simulating ordinary room illumination. The apparent rates of fading for FD&C Yellow #5, FD&C Blue #1 and FD&C Red #3 were determined under each light source. The relationship of the protective effect of the ultraviolet absorber with different light sources is discussed.

Color Stability of Tablet Formulations VI. Temperature Dependency of Colorant Loss in Tablets at Various pH Levels.
By C. J. Swartz, L. Lachman, T. Urbanyi, S. Weinstein and J. Cooper. CIBA Pharmaceutical Products Inc., Summit, New Jersey.

The influence of temperature and pH on the surface color and total dye content for tablets colored with selected dyes was studied. The representative dyes included were FD&C Blue #1, FD&C Yellow #5 and FD&C Red #4. Samples of tablets colored with these dyes and buffered at several pH levels were stored at elevated temperatures and tested for both residual dye concentration and fading at their surface. Effects due to photodegradation were eliminated by using amber bottles covered with an opaque material for sample storage.

Cellulose Acetate Succinate as an Enteric Coating for Some Compressed Tablets.
By D. P. Bennett, M. M. Kochhar and F. P. Cosgrove. The University of Texas, College of Pharmacy, Austin, Texas.

The preparation and testing of compressed tablets of barium sulfate and sodium chloride coated with cellulose acetate succinate are described. In most cases, satisfactory enteric coatings were obtained when the test material, in an acetone-ethyl acetate solution, was applied by the "pan" method using talc as a dusting powder. Generally, cellulose acetate succinate coatings which were stable for three and one-half hours in Simulated Gastric Fluid, U.S.P. XVI, dissolved sooner in Simulated Intestinal Fluid, U.S.P. XVI, than control coatings of cellulose acetate phthalate applied and treated in a similar manner. The presence of pancreatin in the Simulated Intestinal Fluid appeared to have little effect upon the speed at which the test coatings dissolved.

The Physics of a Three Roll Ointment Mill.
By Wilfred J. Crowell, University of Southern California, School of Pharmacy, Los Angeles, California.

The physics of a three roll ointment mill is discussed, and an equation is derived to express the theoretical volume of ointment milled per unit time.

Synthesis of α- and β-Amino Ketone Analogs of Amino Acids as Antibacterial Agents.
By Shu-Sing Cheng, School of Pharmacy, University of North Carolina, Chapel Hill, North Carolina.

A previous paper [S. Cheng, and S. Jonsson, *J. Am. Pharm. Sci. Ed.*, *49*, 611 (1960)] on the synthesis and *in vitro* activity of β-amino ketone analogs of β-alanine has suggested that α-amino ketone analogs of α-amino acids might possess similar activity. α-Amino ketone analogs of glycine, α-alanine, leucine, tyrosine, phenylalanine and aspartic acid were synthesized. The aliphatic series of analogs were prepared by the hydrolysis of acylamido ketones obtained from Dakin-West method. The aromatic series of analogs were synthesized by the hydrolysis of phthalimido ketones prepared by Friedel-Crafts acylation. Both methods have limitation within the scope of applicability. The difficulties in using these two methods for preparing certain analogs were overcome by the use of organocadmium reagents. This demonstrates that organocadmium reagents are applicable to the preparation of the aliphatic as well as aromatic series of α- and β-amino ketone analogs of amino acids. The heterocyclic series of β-amino ketone analogs of β-alanine were synthesized from the hydrolysis of the phthalimido ketones prepared from the condensation of β-phthalimidopropionic acid, thiophene or furan under the catalysis of P_2O_5. These series of α- and β-amino ketones have been found to be active *in vitro* against the growth of bacteria of several genera.

The In Vitro Antimicrobial Activity of Amino Ketones.
By Shu-Sing Cheng, School of Pharmacy, University of North Carolina, Chapel Hill, North Carolina.

α- and β-Amino ketone analogs of amino acids were synthesized as antagonists of amino acids in the microbial metabolism. Analogs of glycine, α-alanine, β-alanine, leucine, tyrosine, phenylalanine, and aspartic acid have been screened against *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Bacillus anthracis*, and different species of fungi *in vitro*, and found to be active in growth-inhibition at different concentration levels varied with the test culture. The study of the growth response of the test bacterium in a liquid medium with and without the presence of the drug provides an accurate means for the *in vitro* evaluation of the relative antibacterial activity of the chemotherapeutic agents. The number of generation of microbial growth before multiplication was arrested by the action of a drug can be calculated; the drug activities are compared on this

basis. The method serves also as a means for studying the dynamics as well as the mode of antibacterial action.

A Comparison Study of Alkyl Boronic Acids with Boric Acid.
By Stephen M. Sleight and Muriel C. Vincent. North Dakota State University College of Pharmacy, Fargo, North Dakota.

The bacteriostatic activity of two alkyl boronic acids were compared with boric acid. In addition, some primary irritation and chronic toxicity determinations of the compounds were accomplished. The results indicated that nonyl boronic acid and dodecyl boronic acid possessed bacteriostatic activity superior to boric acid and that very dilute concentrations of these compounds could be employed to achieve bacteriostasis. Toxicological testing showed the alkyl boronic acids employed to be only mildly irritating and apparently non-toxic when applied to animal skin.

Studies on the Mechanism of Action of Phenolic Disinfectants. I. Release of Radioactivity from Carbon-14 Labeled Escherichia Coli.
By Joseph Judis, University of Toledo College of Pharmacy, Toledo, Ohio.

Experiments were conducted to determine whether phenolic disinfectants can cause damage to the cell membrane of microorganisms. *Escherichia coli* ATCC 11229 was labeled with carbon-14 by incubating a concentrated cell suspension with C-14 glutamate. The labeled cells were incubated with phenol, p-chloro-m-xylenol, dichloro-m-xylenol, 2,4-dichlorophenol, 2,4,6-trichloro-phenol, p-chloro-o-cresol, and p-chloro-m-cresol and damage to the cell membrane studied by determining both radioactivity released from the cells and residual radioactivity in the cells. The phenolic disinfectants studied were found to cause a release of radioactivity from the cells which occurred only to a slight extent in the absence of the former and which was related to concentration. The effects of pH and Tween 80 were determined on the release of radioactivity from and oxidation of glucose by *E. coli*. It appears that damage to the cell membrane as measured in the above procedure may be a mechanism by which phenolic disinfectants are lethal to *E. coli*.

A Manometric Method for the Evaluation of Preservatives.
By John L. Wailes, Montana State University School of Pharmacy, Missoula, Mont.

This investigation was undertaken to determine the feasibility of using a Warburg manometric method as a screening technique for the evaluation of agents used as preservatives in pharmaceutical preparations. Also it was of interest to determine whether or not this method could be adopted to reveal the relative effectiveness of different preservatives, and preservative-surfactant combinations. A method has been adopted. The respiratory effects on baker's yeast was determined with methyl-paraben, propyl-paraben, and sorbic acid, separately at five concentrations, and each in the presence of five different concentrations of Polysorbate 80. Each of the three preservatives caused a decrease in oxygen consumption of baker's yeast. In general, the order of decreasing effectiveness was propyl-paraben, sorbic acid, and methyl-paraben. However, at the lowest concentration 0.025%, sorbic acid was the least effective of the three preservatives. Polysorbate 80 decreased the effectiveness of each of the three preservatives. The preservative least affected was sorbic acid. However, a combination of 0.025% sorbic acid and Polysorbate 80 did not inhibit oxygen consumption. The results are in general agreement with those found by more time consuming

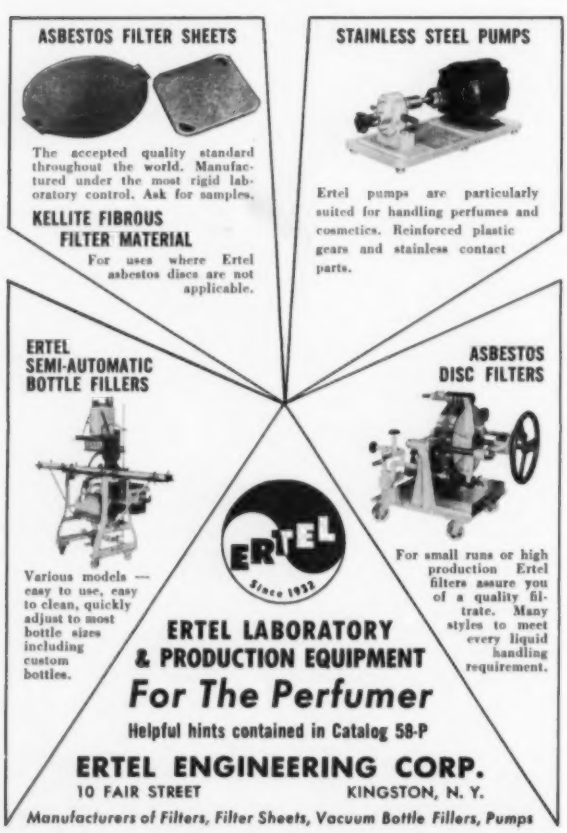
and laborious precedures. It is concluded that this technique is informative, efficient, and the results are reliable.

Dioctyl Sodium Sulfosuccinate Tablet Coating.
By William L. Schalker and Muriel C. Vincent. North Dakota State University College of Pharmacy, Fargo, North Dakota.

A tablet film-coating process using dioctyl sodium sulfosuccinate was easily performed on tablets in a relatively short period of time using conventional coating equipment. The coating showed exceptional resistance to heat, light and trauma. On the other hand, an inherent weakness towards environmental moisture could be prevented. The coating has the advantage of being non-caloric in composition and does not hinder disintegration of the tablets.

An Infrared Method for the Determination of Ethanol in Tincture Thimerosal, N. F.
By Frederic A. Gronau, Donald E. Broadlick, and James E. Hamilton. Analytical Department, Eli Lilly and Company, Indianapolis, Indiana.

The distillation method of determining ethanol in Tincture Thimerosal, N.F. is both time consuming and involves special handling to prevent the acetone in the preparation from interfering. A shorter method is described based on the extraction of the ethanol into carbontetrachloride and the measurement of the infrared absorption at 11.37 microns. The relative freedom from interference by other alcohols and acetone assures greater specificity than the distillation method. The acetone present in Tincture Merthiolate, N.F. can also be determined using the same extracted solution by reading the absorption of the carbonyl band at 5.86 microns.


ASBESTOS FILTER SHEETS
The accepted quality standard throughout the world. Manufactured under the most rigid laboratory control. Ask for samples.
KELLITE FIBROUS FILTER MATERIAL
For uses where Ertel asbestos discs are not applicable.
STAINLESS STEEL PUMPS
Ertel pumps are particularly suited for handling perfumes and cosmetics. Reinforced plastic gears and stainless contact parts.
ERTEL SEMI-AUTOMATIC BOTTLE FILLERS
Various models — easy to use, easy to clean, quickly adjust to most bottle sizes including custom bottles.
ASBESTOS DISC FILTERS
For small runs or high production Ertel filters assure you of a quality filtrate. Many styles to meet every liquid handling requirement.
ERTEL
Since 1932
ERTEL LABORATORY & PRODUCTION EQUIPMENT
For The Perfumer
Helpful hints contained in Catalog 58-P
ERTEL ENGINEERING CORP.
10 FAIR STREET KINGSTON, N. Y.
Manufacturers of Filters, Filter Sheets, Vacuum Bottle Fillers, Pumps

The Identification of Salicylanilide By Its Alkaline Hydrolysis Products.
By LaVerne D. Small and James C. Arntzen, University of Nebraska, College of Pharmacy, Lincoln, Nebr.

The National Formulary, XI, lists 2 tests for the identification of salicylanilide. The first test is based upon a color reaction with ferric chloride. The second test is intended to be an alkaline hydrolysis of the salicylanilide followed by precipitation of salicylic acid upon the acidification of the hydrolyzed mixture. Investigation of the white precipitate thus formed, proved it to be salicylanilide instead of salicylic acid as claimed in the N.F.XI. Attempts to hydrolyze the salicylanilide in various alkaline solvents failed to yield any detectable salicylic acid. A more sensitive and accurate test was devised utilizing a color reaction produced by aniline and a sodium nitroferricyanide solution. Simple distillation of the aniline from the aqueous alkaline hydrolysis mixture afforded easy separation of this reaction product. The resistance of salicylanilide to hydrolysis is in accord with the result predictable from the hydrolysis mechanism discussed by C. K. Ingold. It is suggested that the modification of the identification test for salicylanilide employed in this study, namely the identification of the aniline fraction instead of the salicylic acid fraction of the hydrolysis reaction, would provide a more positive means of establishing the identity of salicylanilide.

Analysis of Thymol and Eugenol Employing Ion Exchange Resins.
By Floyd A. Wagner and Muriel C. Vincent. North Dakota State University College of Pharmacy, Fargo, North Dakota.

A quantitative analysis for thymol, eugenol and clove oil has been developed by means of a spectrophotometric-anion exchange procedure. Suitable reagents which will produce colored compounds with small amounts of the phenolic substances have been selected. A comparison with the official assay for clove oil has been made. The ion exchange method indicated a full recovery of the phenols present in the oil and could be conducted in a much shorter period of time than the official method.

Preparation and Properties of New Gastric Antacids V. Aluminum-Magnesium Hydroxide Dried Gels.
By Stewart M. Beekman. Reheis Co., Berkeley Heights, New Jersey.

The preparation and properties of nine new aluminum-magnesium hydroxide dried gels are described. The aluminum to magnesium atomic ratios of the various preparations are 2:1, 1:1, and 1:2. Three dried gels contain sorbitol and three contain glycine. The antacid characteristics as determined by the modified Holbert, Noble, and Grote technique is shown to be very rapid and prolonged in the optimum pH range. They compare favorably with clinically proven liquid aluminum hydroxide gels similarly tested.

Solubilization in Nonpolar Solvents.
By W. I. Higuchi and Jagdish Misra. University of Wisconsin School of Pharmacy, Madison, Wisconsin.

The water solubilizing capacities of the solutions of Aerosol O. T. (AOT) in normal aliphatic hydrocarbon solvents from *n*-heptane to *n*-octadecane were determined as functions of AOT concentration and temperature. The method of determination involved the adding of water to the AOT solutions up to the turbidity point. The solubilizing capacity was found to be strongly de-

pendent on the solvent chain length, increasing with decreasing chain length. For example, in octane solution at 30°c. about 50 moles of water per mole AOT can be solubilized, while only 5 moles can be solubilized in hexadecane solutions. These mole-mole ratios were found to be relatively independent of AOT concentrations. The solubilizing capacity increases with temperature for the high molecular weight solvents but decreases for the low molecular weight solvents. These data appear to be consistent with the idea that in the lower molecular weight solvents the micelle exteriors are more strongly solvated.

Complexation of Organic Substances in Aqueous Solution By Hydroxyaromatic Acids and Their Salts.

By T. Higuchi and Arge Drubulis. University of Wisconsin School of Pharmacy, Madison, Wisconsin.

Apparent stability constants in water of approximately 100 molecular complexes formed between aromatic acids hydroxylated to varying degrees and their salts, on one hand, and four organic compounds, theophylline, hydrocortisone, prednisolone and phenacetin, on the other, are reported. The data show that introduction of -OH into the first group, particularly ortho to a carboxylate grouping, produced marked enhancement in binding. The relative magnitude of the constants suggest that neither the squeezing out force nor hydrogen bonding is significantly responsible in most instances for the observed effects.

Physical Degradation of Emulsions via the Molecular Diffusion Route and the Possible Prevention Thereof.

By W. I. Higuchi and Jagdish Misra. University of Wisconsin School of Pharmacy, Madison, Wisconsin.

The quantitative aspects of the rate of growth of the large particles and the rate of dissolution of the small particles in emulsions were theoretically examined for the case in which the process is diffusion controlled in the external phase. It was found that even if the miscibility of the dispersed phase is as low as about 1 x 10^{-7} Gm. per ml. the size distribution of micron size emulsion particles may change appreciably in one year. Furthermore, according to this mechanism the emulsion stability is approximately proportional to the particle volume. It is proposed that such unstable emulsions may be stabilized with respect to this process by the addition of small amounts of a third component which must distribute preferentially in the dispersed phase. Sedimentation experiments carried out with carbon tetrachloride emulsions in water with and without hexadecane and Nujol as additives support the theory.

Rheology of Pharmaceutical Emulsions.

By B. B. Sheth and Albert M. Mattocks. College of Pharmacy, University of Michigan, Ann Arbor, Michigan.

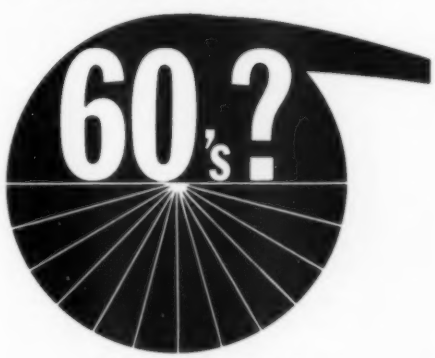
An investigation was undertaken to determine the effects of concentration of dispersed phase, concentration of suspending agent, type of emulsifier, and homogenizing pressure on rheological properties of emulsions. An automatically controlled rotational viscometer, which furnished continuous recording of flow curves, was used for this purpose. The Structure Equation was used to describe the flow curves since non-Newtonian flow was observed for most emulsions. Calculation of the parameters from flow data was achieved by means of the IBM 704 computer. It was shown that limiting viscosity could be calculated directly from the parameters of the Structure Equation. Related coefficients of Viscosity could be calculated from these values. Parameters of the Structure Equation and coefficients of viscosity were found to be related by appropriate equations to the experimental variables.

for UNIFORM PURITY
UNIFORM TEXTURE
UNIFORM WHITENESS

Experimental data and practical manufacturing experience of over 100 years' specialization in beeswax and beeswax compounds are at your service without cost or obligation. Write about your beeswax problems to WILL & BAUMER CANDLE CO., INC., Syracuse, N. Y. Est. 1855 *Dept. AP*

Spermaceti—Cerasine—Red Oil—Yellow Beeswax—Composition Waxes—Stearic Acid—Hydistear

Are your products up to the



Today's Ritter products *are years ahead... assuring your* future *in today's markets.* Your inquiries invited.

F. RITTER & COMPANY

Ritter International

GENERAL OFFICES:
4001 Goodwin Ave., Los Angeles 39, Calif.
Plants in Los Angeles, Chicago, Ill., and Anaheim, California.

BRANCHES THROUGHOUT THE WORLD

Check List of Best Selling Technical Books

COSMETICS, SCIENCE AND TECHNOLOGY. The editorial board of this encyclopedia cosmetic work is made up of H. D. Goulden, E. G. Klarmann, and Edward Sagarin, executive editor. It is in five parts: I, Scope of Cosmetics (80 pages); II, Toilet Preparations (812 pages containing 800 formulas); III, Manufacture and Technology (214 pages); IV, Physiological Considerations (92 pages); plus preface and complete index. The sixty-five experts who contributed, are a "who's who" of cosmetic chemists in the United States and Canada. 1433 pages. Illustrated. Price $19.50.

PRESSURIZED PACKAGING (AEROSOLS). By Alfred Herzka, Jack Pickthall. Although technical problems occur with all types of packages, those which arise with pressurized packages are many and complex. This reference book, by two recognized authorities deals with propellants, containers, valves, filling methods, laboratory procedures, emulsified systems, and perfumes. There is a complete section containing more than 200 formulations, including foods, insecticides, cosmetics, paints, and numerous other products. 400 pages. Illustrated. Price $15.00.

FOOD FLAVORINGS—COMPOSITION, MANUFACTURE, AND USE. By Joseph Merory. This is the first technical book devoted solely to the development, manufacture, and uses of all kinds of food and beverage flavors, both natural and imitation. Written by an expert who has devoted his entire life to the manufacture of flavors, it contains hundreds of formulas and up-to-date commercial procedures now in use for making all kinds of flavors and flavoring extracts. 370 pages. Price $13.00.

COSMETICS—THEIR PRINCIPLES AND PRACTICES. By Ralph G. Harry, discusses the skin, its nutrition and scientific care: the hair, its proper grooming, the physio-chemical problems involved in its washing; the teeth and their care, covering the present status of different dentrifices, and the luster-producing properties of ingredients. Much of the information has its source in the research activities of its author, embracing chemistry, dermatology, and microbiology. 786 pages. Illustrated. Price $17.25.

THE ESSENTIAL OILS. By Ernest Guenther, with the collaboration of leading experts, this monumental six-volume work includes: Vol. I, Origin and Development of Essential Oils. 427 pages. Price $9.50. Vol. II, detailed data on several hundred constituents of essential oils. 852 pages. Price $13.50. Vol. III, discusses the oils of the plant families Rutaceae and Labiate. 777 pages. Price $13.50. Vol. IV, covers the widely used oils: citronella, lemongrass, bois de rose, cassia, and others. 752 pages. Price $13.50. Vol. V, takes up other oils of special interest to flavor, perfume and soap manufacturers: rose, ginger, cardamon, anise. 507 pages. Price $13.50. Vol. VI, completes the monographs on individual oils: wintergreen, sweet birch, juniper berries, and the numerous pine oils. 552 pages. Price $13.50.

INTERNATIONAL ENCYCLOPEDIA OF COSMETIC MATERIAL TRADE NAMES. By Maison G. deNavarre, brings you reference data you will turn to constantly . . . the most complete listing of all the materials of the world used in cosmetic manufacture . . . including quick concise descriptions of approximately 4,000 materials . . . the names and addresses of the suppliers . . . and a very useful cross-index of the materials and their uses. You will use it when seeking new materials, or substitutes for those you may now be using. 400 pages. Price $7.50.

HANDBOOK OF COSMETIC MATERIALS. (Their Properties, Uses, and Toxic and Dermatologic Actions). By Leon Greenburg and David Lester. Contains alphabetical listing, with frequent cross references, of information on approximately 1,000 substances. For each compound gives: formula (including collateral names), properties, toxic action, dermatological action. Exhaustive bibliography. Essential for manufacturing chemists, cosmetic industry, dermatologists, allergists. 467 pages. Price $14.50.

PERFUMERY SYNTHETICS AND ISOLATES. By Paul A. Bedoukian. This carefully compiled volume meets the genuine need for authoritative data on perfumery synthetics. It embraces the history, chemistry, physical and chemical properties, manufacture, uses, and other pertinent data of the principal perfumery compounds; and covers the important perfumery synthetics. A complete index adds to the value of this important work. 488 pages. Price $10.25.

MANUAL FOR THE ESSENCE INDUSTRY. By Erich Walter. Comprises methods, with formulas for making all kinds of essences for liquors and alcoholic drinks, fruit juices and jams, mineral waters, essences for fruits and other vegetables, essences for confectionery and pastry. Describes raw materials and laboratory practice. Discusses taste and the transfer to foods and beverages. 427 pages. Illustrated. Price $8.25. Published 1916.

AMERICAN PERFUMER DOCUMENTARY

Now, between the covers of the new AMERICAN PERFUMER DOCUMENTARY, you can have a wealth of current information . . . formulations, technical data, and processing techniques for . . .

- **HOUSEHOLD SPECIALTIES**
- **PHARMACEUTICAL COSMETICS**
- **PRESERVATIVES & ANTI-OXIDANTS**
- **SURFACTANTS**
- **COSMETIC EMULSIONS**
- **AEROSOL PACKAGING**

Whether you are a research director, chemist, or technician, you will want to have this important reference work always handy in your working library.

Price $5.00 postpaid

- ☐ **COSMETICS, SCIENCE AND TECHNOLOGY. — $19.50**
- ☐ **PRESSURIZED PACKAGING (AEROSOLS).—$15.00**
- ☐ **FOOD FLAVORINGS — COMPOSITION, MANUFACTURE, AND USE. — $13.00**
- ☐ **COSMETICS—THEIR PRINCIPLES AND PRACTICES. — $17.25**
- ☐ **THE ESSENTIAL OILS. (Specify Volume)**
- ☐ **INTERNATIONAL ENCYCLOPEDIA OF COSMETIC MATERIAL TRADE NAMES. — $7.50**
- ☐ **HANDBOOK OF COSMETIC MATERIALS.—$14.50**
- ☐ **PERFUMERY SYNTHETICS AND ISOLATES. — $10.25**
- ☐ **MANUAL FOR THE ESSENCE INDUSTRY. — $8.25**
- ☐ AMERICAN PERFUMER DOCUMENTARY. — $5.00

AMERICAN PERFUMER, *Book Dept.*

418 N. Austin Blvd., Oak Park, Illinois

Enclosed find check for $ for which send me the books checked.

Name .....

ADDRESS ☐ **Home** ☐ **Business** .....

City ..... **Z** ..... **State** .....

Company .....

Instrumentation discussed by Buc at New England SCC

Instrumentation in the cosmetic industry took the spotlight at the first Fall meeting of the New England Chapter of the Society of Cosmetic Chemists.

In discussing how instrumentation can be used and what can be accomplished with it, Guest Speaker Dr. George L. Buc predicted that the use of paper chromatography would be speeded up by a factor of 25 and infra-red by a factor of 100 over the next 20 years.

Dr. Buc, assistant to the president of Fisher Scientific Co., Pittsburgh, Pa., and a pioneer in the field of laboratory instrumentation, also predicted that fluorescence will have many of its problems solved and prove to be an extremely valuable tool for the analyst.

The speaker covered other fields of instrumentation in the laboratory, such as; visual, ultra-violet, infra-red spectrophotometry, gas chromatography, mass-spectroscopy and nuclear magnetic resonance.—by **R. P. Reavey**, Publicity Chairman, New England SCC

Lecture convention planned by German Cosmetic Chemists

Following the London IFSCC Congress, July 2-5, next year, a lecture convention will be held in Hamburg. The American Association, which will be present in London, will take part in the convention. Subjects to be discussed will be published soon. —by **Dr. Herbert Neugebauer**, Secretary, AGCC.

. . . Beauty

. . . Schönheit

. . . Beauté

The language may differ, but the meaning's the same. In all countries, the constantly changing world of fashion means new trends in everything for the woman's personal beauty care. See the newest in cosmetics and toilet articles at the

FRANKFURT INTERNATIONAL FAIR
Frankfurt, Germany
February 18-22, 1962

For information:

GERMAN AMERICAN CHAMBER OF COMMERCE
666 Fifth Ave., New York 19, N. Y.

Parfums Anjou selects

Metal Fab's

New *Princess* Style Cosmetic Aerosol Line.... *for the Look of Quality, Low Cost!*

FEATURES:

- **EASY ASSEMBLY**
- **2 PART UNIT—CAP AND COLLAR**
- **4 POPULAR SIZES— 16cc, 22cc, 1¼ oz. and 2 oz.**
- **2 STOCK DESIGNS— STRAIGHT WALL OR FLARE CAP.**

Designed for Cosmetics, Perfumes, Personalized Sprays.

Accommodates stock size mounting cups and valves of your choice.

Finished in Polished Brass, Texture, Brush, Enamel, Silk Screen, or to your specifications.

Look to MF to develop a practical, economical solution to your package problem. Let MF direct you to proper styling and design with finished scale models and small runs for market testing.

Phone Weehawken, N.J., UNion 6-1277
for samples and prices, or write Dept. AP

Metal Fabricationsinc.
204 Cherry Street • Waterbury, Conn.

National Sales Agents • MONROE-DANFORD & CO., 974 Boulevard East P. O. Box 807, Weehawken, N. J.

A NEW DOOR OPENS

FOR THE BUYER OF AROMATIC PRODUCTS

Vanderbilt quality and integrity are traditional in the chemical field. We now offer

AROMATIC PRODUCTS
MASKING ODORS FOR INDUSTRY
FLORAL BASES
TRUODORS (For Perfumes and Toilet Waters)

These products were formerly manufactured and sold by the C. E. Ising Corp. They are now available as Vanderbilt products, with Vanderbilt service.

Call or Write

R. T. VANDERBILT COMPANY, INC.
SPECIALTIES DEPARTMENT
230 Park Avenue New York 17, N Y

RONA™

Natural PEARL PIGMENT CONCENTRATES

We have taken Nature's unique crystalline pigment guanine from the scales of fish and highly purified it specifically for cosmetic formulations.

Non-Lead Synthetic PEARL PIGMENT CONCENTRATES

are now available. Proven Non-Toxic in Animal Studies. RONA PEARL is a new and distinctive high fashion color for:

Nail Enamel — CN base
Lipstick — CO base
Face Powder — powder
Eye Make-up — CO or MO base
Hair Preparations — AQ or Alc. base
Creams, etc. — AQ or Alc. base

New . . . 12 PAGE TECHNICAL BROCHURE AND CONVENIENT WALL CHART AVAILABLE ON REQUEST

. . . See at a glance the properties of many natural and synthetic pearl pigments, their chemical and physical characteristics, and recommended uses.

RONA PEARL CORPORATION
A division of Rona Laboratories, Inc.
EAST 21 & 22 ST., BAYONNE 27, NEW JERSEY
Largest Exclusive Manufacturers of Pearl Essence
Plants: Maine • New Jersey • Canada

6

News of the American Society of Perfumers

Fischbeck talks to perfumers on Far East and Paraguayan essential oils

A fascinating exposition on the production and marketing methods for essential oils in widely scattered sections of the world was given by C. Lloyd Fischbeck, manager of the essential oil department of the George Uhe Co. before a large audience of the American Society of Perfumers at its October 18 meeting in New York City.

Color photos taken by the speaker in Formosa, India and Paraguay during his recent trips showed distillation facilities, landscapes and natives at work in the essential oil producing regions. The steps involved in the movement of oils from the stills to the shipping areas and some comparisons of problems inherent in the individual areas were emphasized.

Formosan essential oils such as citronella, patchouli, ho oil, etc. were discussed after scenes of Taipei, the modern capital with its comfortable Grand Hotel were shown in contrast to the producing areas. South of the capital in the picturesque mountain area, photographs were shown of citronella growing on hillsides and mountain slopes. The speaker said that newly planted grass may be harvested in six months and again at intervals of about four months. Before distillation, the grass is allowed to dry somewhat, often in small field stills, but where feasible large, centrally located distilleries are used for a fee. In today's market the fee runs to about 10% of the oil distilled.

Continuing, Fischbeck told the group that water supply is a problem and stills are generally located on a river or a stream. Fuel to produce the steam ranges from dried exhausted grass to natural gas. Some efficient distilleries complete distillation in three hours for each charge. The stills are packed by hand and the exhausted grass is removed by pitchfork.

The individual farmer holds his oil for an opportune time to sell. This is generally done through his local area collector or field broker. From this point, oil is delivered to a central marketing area, such as Maoli, where it is bulked and tested by official laboratories in preparation for shipment to foreign markets.

Weather was cited by the speaker as a factor in production; long periods of drought or heavy rains affect the distillation. Floods and washouts in mountain areas make transportation of oil to shipping ports difficult or impossible at times.

In the south of India on the western Malabar coast, lemongrass is grown, Fischbeck continued. The grass is cut by hand and is then bound to make gathering easier. After drying in the sun it is transported to small local stills by ox cart. The distillation process

is much more crude than that for Formosan citronella. The grass is put into stills partially filled with water, often taken from nearby wells. A direct fire, often wood fueled, cooks the grass until steam has been created and distillation begins.

Marketing of the oil is similar to that employed with Formosan citronella. Authorized shippers must have the oil certified by government analysis to meet Agmark specifications before shipment can take place. Government experimental stations are continually testing new strains of grass and are promoting an educational program to increase the efficiency of the many small distilleries.

According to Fischbeck, the East Indian sandalwood oil production is largely controlled by the wood auctioned by the government. Mysore State and some parts of Madras comprise the area in which sandalwood is indigenous and abundant. The governments of these states decide what trees are to be cut and offered for sale through annual or semi-annual auctions.

The tree is a semi-parasite, obtaining nourishment from other plants in the early stages of its growth. Only trees thirty years or over are cut. The branches, bark and sapwood are removed leaving the heartwood and the roots to be auctioned. The wood is offered under many gradings and classifications for various purposes. These grades bought for distillation are principally distilled in India with about 20% exported to the United States and elsewhere.

The speaker showed photographs of many distilleries in Madras, Mysore and the more northerly states of Uttar Pradesh and Bombay. Of these the Government Sandalwood Oil Factory at Mysore has the largest capacity. Transportation of coal for fuel and the logs from the auction areas are among the uncertainties faced by the distillers. The Indian government insists on Agmark inspection of all oil before exportation.

Palmarosa oil, Fischbeck pointed out, is distilled from grass which grows in the regions north and east of Bombay. Distillation is done in the growing areas and field brokers collect oils for the Bombay shippers. It is anticipated that Agmark requirements governing the specifications for oil to be shipped from India will be finalized in the near future, the speaker said.

Interesting comparisons were made by Fishbeck of essential oil production in land-locked Paraguay, South America, as contrasted to the situations in Formosa and India. He noted that distillation of petitgrain oil from the leaves and twigs of bitter orange trees was often done in crude distillation apparatus. Collections of oil from the distilleries is often hampered by poor road conditions. Among the many interesting color photos shown by the speaker were cultivation of orange trees for the production of petitgrain oil, and examples of collection facilities at trading stores in the interior. Also he described and illustrated other essential oils, such as guiacwood and lemongrass from Paraguay.

The speaker concluded by telling that shippers in Asuncion have, at certain seasons of the year, direct ocean steamer service for freight. At other times low water forces the use of river barges for more than the four hundred mile journey down the Paraguary and Parana rivers to Buenos Aires, Argentina, before cargo can be transhipped on ocean steamers. Society President Harry Cuttler, who presided at the meeting, called for a rising vote of thanks to Mr. Fischbeck for his interesting and informative lecture which was given amid a hearty round of applause. —by William Lambert.

Proceedings available

Copies of the Proceedings of the recent Annual Symposium of the American Society of Perfumers have been prepared. These reprints, which include the introduction, the four complete papers, and the discussion from the floor can be ordered from the Society. Copies are $1.00 each, from the Society, P. O. Box 229, Clifton, N. J.

R. D. WEBB & CO., INC.

Distillers of essential oils of outstanding quality.
Exclusive American agents for genuine

MYSORE SANDALWOOD OIL

R. D. WEBB & CO., INC. Main Office: Linden, New Jersey
Branches: Cos Cob, Conn.; Chicago; Los Angeles

CALL ON WHITTAKER FOR...

Cosmetic Titanium Dioxide N.F.

"Alpine" Talc USP and TECH. Chemically Beneficiated

Thomasset Certified Cosmetic Colors

Eye Make-Up Colors

WHITTAKER

Whittaker, Clark & Daniels, Inc.
100 Church St., New York, N. Y.

There's been an overwhelming response to

Freshner II

The new refreshing lift for scented products

The overwhelming response to our new perfume specialty, Freshner II, *proves its ability to breathe new life into old products, add fresh highlights to new ones.*

Refreshing is the best word for Freshner II, *used alone or to enhance finished perfume formulas, but always for greater originality.*

In creams, in soaps, in powders, aerosols and perfumes, add a clean, fresh lift without intruding, without affecting odor character and strength, stability or color.

You will find that Freshner II *adds a beneficial fixative effect as well.*

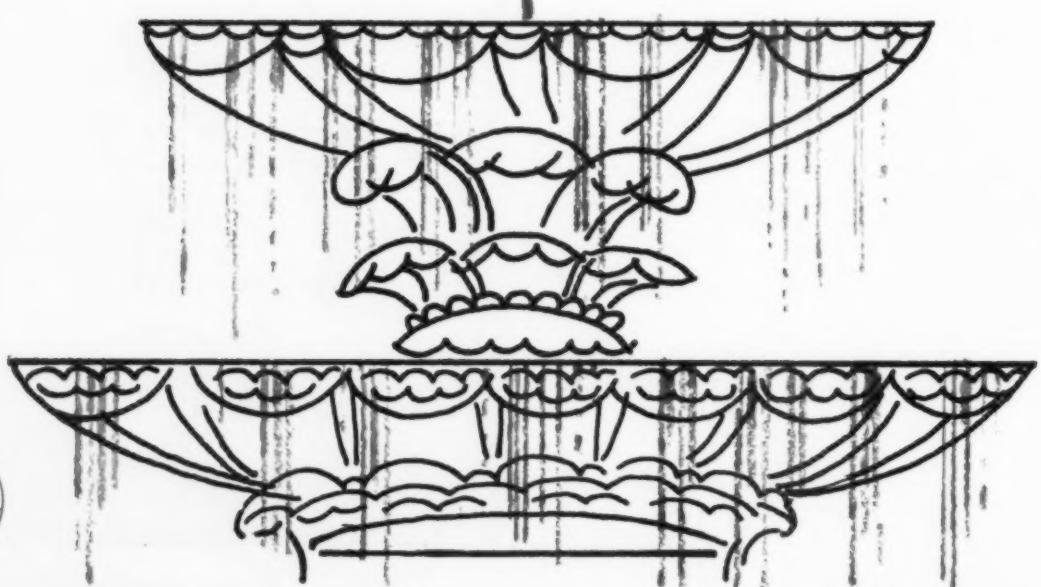
For suggested concentrations, full details and samples, write today.

PRICE $12.50 per lb.

Synfleur

SCIENTIFIC LABORATORIES, INC.

MONTICELLO, N. Y.



ATLANTA • DETROIT • LOS ANGELES • NEW YORK • SAN FRANCISCO • MEXICO, D. F. • HAVANA • MONTREAL • Guatemala City • San Salvador • San Pedro Sula
Managua • San Jose • Panama • Barranquilla • Medellin • Bogota • Caracas • Maracaibo • Rio de Janeiro • Buenos Aires • Santiago

NEWS & EVENTS

Benson Storfer (left) receives gold desk clock from Perfumery Importers Association President **Bernard d'Escayrac,** president of Guerlain, Inc.

Perfume importers honor Storfer

At a surprise luncheon, recently, members of the Perfumery Importers Association, New York City, honored Benson Storfer, Parfums Corday, for his 50 years in the fragrance industry.

H. Gregory Thomas, president of Chanel, Inc., was toastmaster and principal speaker. The group presented a gold desk clock to Storfer, enscribed: "To Benson Storfer from Perfumery Importers Association 1961."

Poses named to citizens committee of FDA

J. I. Poses, president Parfums D'Orsay, has been named to the citizens committee to study the operation of the Food and Drug Administration. Poses is one of 15 others named to the group that will be concerned with administration of the law and not with future legislation. He represents the toilet goods industry.

Ungerer sole distributor of Sunkist oils

Ungerer & Company, New York City, has signed a three year contract with the Product Sales Department of Sunkist Growers to represent them in the United States and Canada as agents for Exchange Brand lemon and orange oils. Effective, Nov. 1, Ungerer & Company has been retained as the only essential oil firm acting as a distributor for lemon and orange oils produced by Sunkist Growers.

TGA changes policy on convention location

The Board of Directors of the Toilet Goods Association voted recently to hold all future TGA conventions out of New York City. However, all meetings of the Scientific Section will be held in New York City.

Concurrently the Board also endorsed the decision of the Toilet Goods Industry Golf Tournament Committee to hold that event at Winged Foot Club, Mamaroneck, N. Y. each year.

New vice president and general manager of Helene Curtis Internacional S. A., wholly-owned subsidiary of Helene Curtis Industries, Inc., is **Allison B. Hart.** He is a veteran in international trade management, having had 20 years in overseas operations with leading companies in the toiletries, drugs and related fields. He was director of international operations for the Mennen Company for five years; directed foreign operations of the Lambert Company for four years; and was general manager for Sterling Products International, Inc. in India, Mexico and Brazil.

John H. Ehresmann has joined F. Ritter & Co., Los Angeles essential aromatics producer, as salesman in Southern California. He is vice president of the California Flavoring Extract Manufacturers Association, and a member of the local section of the Institute of Food Technologists.

For the third year, **Burton A. Sachs,** merchandise manager of Bloomingdale's, has been named chairman of the current cosmetics and drugs industry's campaign for the Federation of Jewish Philanthropies in New York City. Associate chairmen are **Leonard N. Block,** Block Drug Co.; **Richard Salomon,** Charles of the Ritz; and **Stanley R. Swaback,** Abraham and Strauss.

Bruce Crawford is new advertising manager of proprietaries and toiletries division, Chesebrough-Ponds, Inc. Previously he was with Ted Bates & Co., Inc., advertising agency, as vice president and account supervisor handling Brown & Williamson Tobacco Corp. advertising, and prior to 1958, Crawford spent 3½ years with Benton & Bowles, Inc. as account executive for Procter & Gamble Company.

A recent dinner meeting of the California Cosmetic Association drew a record crowd. Members and guests heard **Tyler MacDonald,** senior vice president of Hixson & Jorgensen Advertising Agency discuss "Why People Buy".

Left to right are: CCA President **James R. Young,** Avon Products; CCA Secretary **Edward Costa,** Kolmar Laboratories; Guest Speaker **MacDonald; Daniel Moncino,** Polak's Frutal Works and **John Denmead,** U. S. Industrial Chemicals, CCA Associate Member Officers.

Fragrance Memo

PRIME SOURCE* FOR QUALITY AROMATICS

RHODINOL PN
VETIVERYL ACETATE

and many other extra fine or newly developed

CHEMICALS
OILS
RESINS

WRITE FOR DETAILS

CUSTOM PROCESSING TO YOUR SPECIFICATIONS

Noville
ESSENTIAL OIL COMPANY
INC.
NORTH BERGEN, N. J.

* produced by
NICKSTADT-MOELLER, INC.
Ridgefield, N. J.
AN ASSOCIATED COMPANY

Left to right: **Herbert C. Buchanan,** IFF export manager, Far East division; **M. Taketsuru,** president Nikka Co., Ltd.; **van Ameringen;** and **Rene Bickart,** president, Oppenheimer & Cie., Ltd.

A. L. van Ameringen, chairman of the board of International Flavors & Fragrances Inc., New York City met recently with industry leaders in Japan.

During his four week visit to the country he visited with various trade groups, and by special invitation spoke before two joint meetings of the Japan Cosmetic Chemists Association and the Japan Perfumery & Flavoring Association in Tokyo and Osaka. A reception was given in his honor at the Imperial Hotel in Tokyo.

Leonard Waldt has been made senior food technologist in the Fine Chemicals Research Laboratory of Shulton, Inc., New York City. Prior to joining Shulton, he was chief food chemist at Morningstar-Paisley, Inc., and previously was associate food technologist for General Foods Corp.

Cuisine Exquise . . . Dans
Une Atmosphère Élégante

RESTAURANT
VOISIN

575 Park Avenue at 63rd St.
NEW YORK

Lunch and Dinner Reservations
Michel: TEmpleton 8-6490

Blaine Crouch is new manager of the Chicago office of Verona Aromatics. Crouch is well known in the industry, having been associated with the aromatic and flavor business for the past 13 years. He joined Verona, Newark, N. J., recently. The firm's Chicago office has been moved to 6027 N. Northwest Highway, Chicago 31.

A. A. Ivancich

Anthony A. Ivancich is new vice president in charge of production at Virginia Dare Extract Company, Inc., Brooklyn, N. Y. He has been with the flavor, extract and syrup maker for 38 years. Since 1928, he has been superintendent of production; was named secretary of the firm in 1956.

Travelers

Ernesto Ventos, Spanish representative for Firmenich et Cie., Geneva, and his wife will visit the United States soon on a business-pleasure trip.

Ventos, whose headquarters are in Barcelona, represents the Swiss essential oil producer in Spain.

Shulton to acquire Aerosol firm

Pending approval of Aerosol Corporation of America stockholders, Shulton, Inc., Clifton, N. J. will acquire the assets of the firm in exchange for Shulton stock.

The Aerosol Corporation's business will continue to be operated in the same manner as in the past, and there will be no change in management. Aerosol President James R. Barnet will continue to head the Wellesley Hills, Mass., firm which markets various aerosol consumer products.

Rutgers perfume conference scheduled for Dec. 6 and 7

An Analysis of Quality Standards of Perfume Materials will be discussed at a two-day conference Dec. 6 and 7 in the Military Park Hotel, Park Place, Newark.

The conference, conducted by Rutgers Newark Extension Center and the University's School of Chemistry, will begin at 9 a.m. Wednesday. Methods and techniques of instrumental analysis will be related to the individual creativeness of odor analysts and chemists. The conference has been designed for laboratory technicians, perfume blenders, cosmetic chemists, salesmen and purchasing agents in the industry.

Al Fiore, manager of market development for the Givaudan Corp., will open the conference with an analysis of "Quality Standards in Perfumery Materials."

V. Daniel Johnston, Givaudan's chief analytical chemist, will discuss "Chemical and Physical Methods of Analysis and Their Significance."

James Rodgers, director of the Instrumental Laboratories at Fritzsche Brothers, Inc. will describe "Instrumentation Techniques as Applied to the Quality Standards of Perfume Materials" during the afternoon session.

In addition, Lewis Hediger, director of organoleptic control for Trubeck Laboratories, will discuss "Organoleptic Techniques as Applied to Industrial Perfumery Quality Standards."

Thursday morning's agenda is:

Fred C. Theile, research administrator for Shulton, Inc., will speak on co-ordinating chemical analysis and organoleptic techniques.

A report on performance evaluation and stability testing of perfume and essential oil materials will be given by Donald E. Dean, manager of Shulton's control and analytical laboratory.

The concluding session will be a panel discussion on some of the problems in the standardization of perfume materials. On the panel will be Harry Saunders, research perfumer for Givaudan; George H. Fuller, manager of perfumery and essential oils research and development, Colgate-Palmolive Company; and Oliver L. Marton, chief perfumer for Shulton, Inc.

Registration information may be secured from Frank Dee, Rutgers Extension Center, 601 Broad St., Newark, N. J. Telephone: MItchell 3-1766.

IFF stock issue proposed for public offering

International Flavors & Fragrances Inc., New York City, has filed a registration statement with the Securities and Exchange Commission for a proposed public offering of 514,432 shares of its common stock, 105,000 shares of which will be sold by two stockholders and 409,432 shares will be sold by the company.

Proceeds of the company's sale will be applied to purchase and retirement of presently outstanding common shares held by a Dutch in-

MAKE UP AND TREATMENT ITEMS
DEODORANTS POWDERS
HAIR PREPARATIONS FRAGRANCE ITEMS
PARIS COSMETICS INC.
Exclusively Private Label
Roosevelt Avenue at 99th Street
Corona 68, Long Island, New York
DEfender 5-1400

SOME NEW AND INTERESTING CHEMICAL SPECIALTIES

CERFOL DF
Green note reminiscent of Parsley.

RESEDOL
Green note reminiscent of Reseda.

VETAROL
Powerful "Woody" note, reminiscent of Vetivert and Birch.

160 — 5th Ave., New York 10, N. Y. **CHelsea 3-1937**

Descollonges INC

vestment company. Fragrance products, which accounted for approximately 65% of the firm's 1960 sales, are used principally in the manufacture of perfumes, toiletries, cosmetics, soaps and detergents.

Pfizer to buy drug and toiletry firms

Chas. Pfizer & Co., Inc. has just announced signing agreements to purchase outstanding capital stock of Thomas Leeming & Co., Inc., and the assets of Pacquin, Inc. in exchange for an undisclosed number of Pfizer common shares. Share owners of Leeming and Pacquin have approved the agreements. The two firms are corporately-linked and market Ben-Gay ointments, Pacquin Hand Creams, Silk 'n Satin Lotion, Mani-Magic Cream Cuticle Remover, and other drugs and toiletries.

The two businesses will be operated on a decentralized basis as wholly-owned subsidiaries of Pfizer, and no personnel changes will be made.

Edward B. Austin, board chairman and president of Leeming and Pacquin companies, continues as board chairman and president of the subsidiaries. Thomas M. Cooney, formerly assistant to Pfizer's president, will join the subsidiaries as executive vice president.

Legion of Honor awarded Elizabeth Arden

Elizabeth Arden has been awarded the order of Chevalier de la Legion d'Honneur by the French Government for her distinguished services and contributions to France. It is a token of appreciation from the French for all that she has done to facilitate trade and good will in the fields of beauty and couture between France and other countries. The French Government's decree was dated Oct. 20. The presentation will be made at a later date.

EOA scientists awarded scrolls

For the first time in the history of the Essential Oil Association of the U.S.A., scrolls have been awarded to its deserving and conscientious chemists who have been active in committee deliberations for a continuing period of five years or more.

At the President's meeting October 5, scrolls were awarded to: **George V. Branigan,** vice president, Ungerer and Co.; **Frank L. Boyd,** Fritzsche Brothers, Inc.; **Eric Bruell,** secretary, Polarome Manufacturing Co.; **A. S. Dubenchiek,** Felton Chemical Co.; **Robert J. Eiserle,** Fritzsche Brothers; **Edward C. Fearns,** International Flavors & Fragrances; **A. T. Fiore,** Givaudan-Delawanna; **Frank R. Forrester,** Hoffmann-LaRoche Inc.; **Charles H. Grimm,** International Flavors & Fragrances; **Louis Hediger,** Trubeck Laboratories; **Gosta Redstrom,** Magnus, Mabee & Reynard; **J. Daniel Johnston,** Givaudan-Delawanna; **E. L. Langenau,** vice president, Fritzsche Brothers; **Herbert M. Schwarz,** Norda Essential Oil & Chemical Co.; and **A. Warren,** Dodge & Olcott.

Flavor group announces convention site

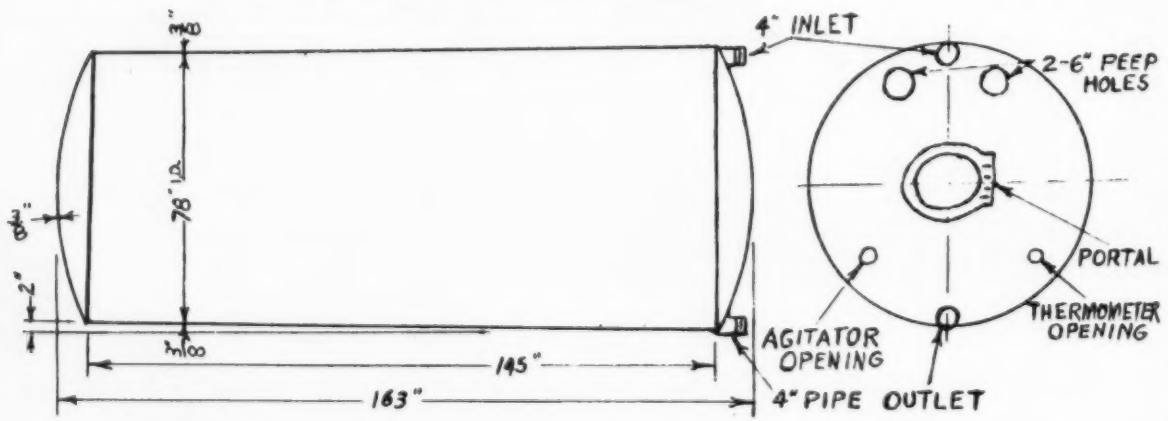
The Flavoring Extract Manufacturers' Association of the United States has scheduled its 53rd annual convention for the Skytop Lodge, Skytop, Pennsylvania beginning April 29, 1962 through May 2.

The technical program is being developed by Dr. Arthur S. Wendt, Fred Fear & Co., Brooklyn, N. Y.

Schimmel takes over Schimmel Boehm Ltd.

As of Nov. 1, Schimmel & Co., Inc., New York City took over operation of Schimmel Boehm Ltd., 19 Bentinck St., London, W.1. Previously the firm was jointly owned by Schimmel & Co., Inc. and Fredk. Boehm Ltd.

attention: PLANT ENGINEER



FOR SALE—76 Glass Lined Storage Tanks—3000 Gallons

Suitable for storage or manufacturing of chemicals, food products, etc.
All welded—3/8" steel—enamel lined
With or without cork insulation
With or without steel saddles
As removed from milk express refrigerator cars

Priced to move at $350 each
F.O.B. our plant—Joliet, Illinois
Loaded cars or trucks—Quantity discount
Inspection Invited—Call or Write
INDUSTRIAL SERVICE & SALVAGE CORP.
28 E. Jackson Blvd., Chicago 4, Ill.
Area Code 312—HArrison 7-0550

New Products

Purse-size dispenser shown for aerosol fragrances

"Tini-Mist", just introduced, is a decorative, self-contained purse-size dispenser for aerosol fragrances.

It is available in aluminum, stainless steel, or glass, and each has flared caps of polished gold lacquered aluminum. The unit has a metering valve which emits a measured amount of spray. There are approximately 200 bursts in an aluminum or stainless steel unit, and about 150 in the glass container.

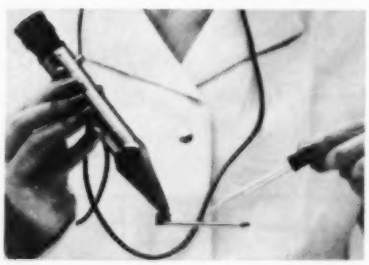
Finishes available include: gold lacquered and polished aluminum and stainless steel, silk screened aluminum and clear or enameled glass.

The Risdon Manufacturing Co., Dept. AP, Naugatuck, Conn.

Sugar refractometer weighs 12 ounces

A hand-held 12 oz. sugar refractometer provides a quick and highly reliable method of measuring the density of sugar solutions. The unit measures density through use of the refractive index based on the principle of total reflection. Solutions can be liquid or paste, transparent or translucent, colored or non-colored.

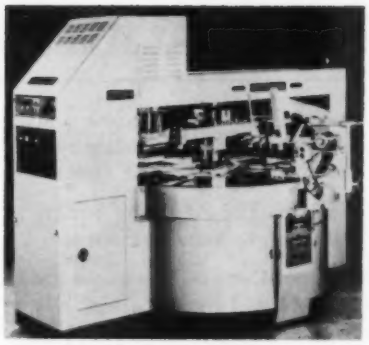
A few drops of sample are placed on the glass base. The base is closed and the sugar density percentage is then read directly from a calibrated scale seen through the telescopic viewer. Tables which give corrections



for temperature variations, and the refractive indices of sugar solution, distilled water and saturated saline solution are provided with each instrument.

Three models are available to measure sugar densities of up to 85%. Maximum length is 8" and maximum dia., 1.4".

Tokyo Shibaura Electric Co., Dept. AP, 530 Fifth Ave., New York City.



New Machine forms display packages

Model SP-4-6 automatically feeds plastic film paperboard blanks from a magazine hopper onto aluminum dies at eight stations on the rotary turntable. Plastic film is formed into a lose pocket and product is inserted manually. Plow folders fold the two halves of the blank together, and they are dielectrically sealed. The package is conveyed past heating units which causes film to shrink tightly around the product. In the final package, the product is hermetically sealed in the plastic pocket.

Specifications of the machine, which requires two to four operators, include: 14" x 18" maximum blank size, 4" maximum product diameter, production speed 2.25 to 4.5 table rotations per minute, two hour changeover time. Table diameter is 6', the machine requires 7' x 8' floor space, and has an over-all height of 7'. Unit weights 3100 lbs.

The Nevins Company, Dept. AP, Clifton, N. J.

GENUINE CONCENTRATED STABILIZED FRUIT AND VEGETABLE COSMETIC EXTRACTS

HORMO-FRUITS

NATURAL SKIN BEAUTIFYING ACTION

–samples and literature on request–

Esperis s.a. Milan (Italy)–Via A. Binda 29–Cable: Fayaud
Agent: American Lanolin Corporation–Lawrence, Mass.
Tel.: Lawrence MU 3-2729

INDUSTRY EVENTS CALENDAR

Nov. 14—**Chicago Perfumery, Soap and Extract Assoc., Inc.,** Annual Thanksgiving Stag Party, Furniture Club of America, Chicago.

Nov. 15—**The American Society of Perfumers,** Advertising Club, New York City.

Nov. 27-Dec. 1—**28th Exposition of Chemical Industries,** New York Coliseum, New York City.

Nov. 28—**Society of Cosmetic Chemists,** Annual Meeting, Hotel Biltmore, New York City.

Nov. 29—**The Toilet Goods Association,** Scientific Section Meeting, Empire Room, Waldorf-Astoria Hotel, New York City.

December 12—**Chicago Perfumery, Soap and Extract Association, Inc.,** Sheraton-Chicago Hotel, Chicago. Annual business meeting. (12:00 noon Luncheon)

Dec. 16—**Chicago Perfumery, Soap and Extract Association, Inc.,** Grand Ballroom, Conrad Hilton Hotel Annual Christmas party. (Dinner-Dance).

1962

April 29-May 2—**Flavoring Extract Manufacturers' Association,** 53rd annual convention, Skytop Lodge, Skytop, Pa.

May 7—**Toilet Goods Industry Golf Tournament,** Winged Foot Club, Mamaroneck, N. Y.

May 9—**Scientific Section of the Toilet Goods Association, Inc.,** Waldorf Astoria Hotel, New York City.

June 24-29—**Joint Convention of the Toilet Goods Association, Inc.** (USA) and the **Toilet Goods Manufacturers' Association of Canada,** Chateau Frontenac, Quebec, Canada.

July 2-5—**The 2nd International Congress of Cosmetic Science,** London, England.

Dec. 5—**Scientific Section of the Toilet Goods Association, Inc.,** Waldorf Astoria Hotel, New York City.

Miniature Perfume Bottles from ⅛ dram to ½ oz.
Handmade Glass Novelties • Miniature Glass Funnels
SPECIAL ORDER WORK
KENBURY GLASS WORKS
205 West 19th Street New York 11, N. Y.

Classified Advertising

POSITION WANTED

PERFUMER—18 years experience. Seeking position to head up fragrance research and development department. Can upgrade your present consumer products and develop new and original products. **Box 61113, AMERICAN PERFUMER, 418 North Austin Blvd., Oak Park, Ill.**

HELP WANTED

FLAVOR CHEMIST—Man or woman wanted by New England manufacturer of fine food flavors. Applicant should have a background in organic chemistry and preferably a working knowledge of gas chromatography. Send detailed resume and salary requirements to **Box 61112, AMERICAN PERFUMER, 418 North Austin Blvd., Oak Park, Ill.**

WELL ESTABLISHED perfume house seeks young and experienced salesman for cosmetic and industrial calls in greater New York area. Replies held in confidence. **Box 61111, AMERICAN PERFUMER, 418 North Austin Blvd., Oak Park, Ill.**

COSMETIC CHEMIST

To direct group in formulation of Cosmetics and other Proprietaries. This is an unusually attractive opportunity for a candidate having a major background in Proprietary Development. Send confidential resume to Personnel Department,

CARTER PRODUCTS, INC.
Cranbury, New Jersey

CHEMISTS

GROUP LEADER—Development

Require Ph.D. and/or equivalent with at least five years related experience or the equivalent for planning, establishing, and supervising development program in aerosols, shampoos, detergents or other hair preparations.

Responsible also for selecting equipment, conducting independent literature research, and overseeing work of chemists and technicians.

PROJECT LEADER—Technical Service to Manufacturing and Production

Require BS Chemical Engineering, two years experience required. Liaison between Research and Development Laboratory and Manufacturing, carrying out engineering and plant scale up for new products. Must develop or improve manufacturing procedures and facilities, conduct tests, run trials and assist in evaluation, interpretation, and reporting of results.

Most satisfactory work conditions including liberal employee benefits.

Kindly apply or send complete resume to:

Employee Relations Department
John H. Breck, Inc.
115 Dwight Street
Springfield, Massachusetts

FOR SALE

COMPLETE SET OF MOLDS for 2, 4 and 8 ounce cologne bottles. Beautiful French design manufactured by T. C. Wheaton Company at cost of $12,000.00. Only used once for one sample run. Will accept $2,500.00 for all three sets. Photographs and specifications sent on request. American Mercantile Company, Inc., 33 West 42nd Street, New York City 36.

NOW OVER 18,000 BIOS CHEMICALS

Including

ALL NEW & RARE RAW MATERIALS

For Perfumes & Flavors
SYNTHETIC & NATURAL

Ask for our new complete catalogue

BIOS Laboratories, Inc.
17 West 60th St., New York 23, N. Y.
PLaza 7-8171

TL Beeswax

- PURE WHITE
- EXTRA QUALITY
- ABSOLUTELY PURE
- ABOVE U. S. P. STANDARDS

• Samples will gladly be sent on request—at no obligation

Serving the Trade for 109 Years

THEODOR LEONHARD WAX CO., INC.
HALEDON, PATERSON NEW JERSEY
Western Distributor: A. C. Drury & Co., 219 E. North Water St., Chicago, Ill.

Aromatic Chemicals
FOR PERFUMERY AND FLAVORS

Iso Propyl Quinoline • Isobutyl Quinoline
Ethyl Anthranilate • Butyl Anthranilate
Linalyl Anthranilate • Linalyl Isobutyrate

Fairmount
CHEMICAL COMPANY, INC.
136 Liberty St., N.Y. 6, N.Y. • Plant: Newark, N.J.

MOULDS for LIPSTICKS MASCARA SUPPOSITORIES STYPTIC PENCILS and DIES for ROUGE COMPACT POWDER

Write for Catalog

A. CAVALLA, INC. 163 West 18th Street, New York, 11, N.Y.

PROFESSIONAL SERVICES

"L'ART de la PARFUMERIE par EXCELLENCE"
And its Application to the Industry

DR. JEAN JACQUES MARTINAT
PERFUMER-CHEMIST CONSULTANT

Whatever your problem may be: of a truly original creation or, of a new interpretation of most successful Perfumes per se. Or, of a more recent approach to Fragrances and Flavors for Cosmetics, Toilet Preparations, Pharmaceuticals or Foods, you may confidently discuss it with me on a unique professional level.

Kindly Inquire 333 WEST 52ND STREET, NEW YORK 19, N. Y.
TEL. PLAZA 7-3861

BIO-TOXICOLOGY LABORATORIES
(John Davis Paul, M.D., Memorial Laboratories)

Second Generation of Continuing Service

NORTH BROAD DIV.
3112 North Broad St.
Phila. 32, Pa.
BAldwin 5-1776

CHERRY HILL DIV.
7703 Maple Ave.
Merchantville 8, N. J.
NOrmandy 5-1776

TOXICITY & APPLIED RESEARCH STUDIES
(animal and human)
Prompt replies to inquiries
Toxicity studies initiated within 48 hours of written authorization

GUARANTEED VIRGIN TESTING STOCK
(We maintain our own breeding farms)

PAUL BEDOUKIAN, Ph.D.
Consulting Perfume Chemist

Creation or revision of fragrance formulas for the perfume, cosmetic, soap and allied industries.

40 Ashley Road
Hastings-on-Hudson, N. Y. Tel. Croton 1-4701

LEBERCO LABORATORIES
Irritation Studies—Sensitivity Tests
Toxicity and Safety Tests on
Shampoos—Cold Wave Lotions—All Cosmetics
Pharmaceutical and Cosmetic Research
Hormones Assays—Bacteriological Studies
127 HAWTHORNE ST., ROSELLE PARK, N. J.

PATHOLOGY ASSOCIATES
Consultation in Pathology for Industry
Pathology Reports Rendered as Required by Food and Drug Administration
Tissues Prepared for Pathology
60 East Township Line, Elkins Park 17, Pa.

SEND FOR Free Data ON RESEARCH

☐ Services for YOU
☐ The Science of Beauty (Cosmetics)
☐ Sensory Panels

Foster D. Snell, inc.
CONSULTING CHEMISTS • CHEMICAL ENGINEERS
29 West 15th Street
New York 11, New York
WAtkins 4-8800
Direct Dialing Area 212
Baltimore, Md.
Bainbridge, N. Y.

Index OF ADVERTISERS

Aerosol Techniques, Inc. –
Albright & Wilson Mfg. Ltd. –
Allied Chemical Corp., General Chemical Division –
American Aromatics 8
American Cholesterol Products, Inc. 46, 48, 50
American Lanolin Corp. –
Anchor Plastics Co. –
Anderson, Carl N. –
Aromatic Products, Inc. 3
Avisun Corporation –

Bedoukian, Dr. Paul 67
Bertrand Freres –
Bios Laboratories, Inc. 67
A. Boake, Roberts & Co., Ltd. 6
Bopf-Whittam Corp. –

Cameo Die & Label Co. 63
Camilli Albert & LaLoue, Inc. 68
Cavalla, Inc. A. 67
Celluplastic Corporation –
Charabot & Co., Inc. 18
Chauvet & Co., Pierre –
Chemo-Puro Mfg. Corp. –
Chimimport 17
Chiris Co., Antoine 4
Ciech, Ltd. –
Citrus & Allied Essential Oils Company –
Classified Advertisements 66
Clintwood Chemical Co. –
Colgate-Palmolive Company –
Continental Filling Corp. –
Coutin Associates –
Croda, Inc. –

Dehydag Products –
deLaire, Inc. –
Descollonges, Inc. 63
Deutsche Hydrierwercke, G.m.b.H. –
Dodge & Olcott, Inc. 51
Dragoco, Inc. 1, 53
E. I. duPont de Nemours –
Duveen Soap Corp. –

Emulsol Chemical Corporation –
Ertel Engineering Corp. 54
Esperis, s.a. 65

Fairmount Chemical Co., Inc. 67
Felton Chemical Co., Inc. –
Firmenich & Co. –
Fleuroma, Inc. 9
Florasynth Laboratories –
Fritzsche Brothers, Inc. –

Geigy Industrial Chemicals –
General Aniline & Film Corp. –
German American Chamber of Commerce 57
Givaudan-Delawanna, Inc. 12, 13
Glycerine Producers' Association –
Goldschmidt Chemical Corp. 20

Halby Products Co. –
Heine & Company –
Henkel International GMBH –
Heyden-Newport Chemical Co. –
Hoffmann La-Roche Inc. 15, 16
Huisking & Co., Inc., Chas. L. –

Industrial Salvage 64
International Flavors & Fragrances, Inc. 49

Katz & Co., Dr. Alexander, Div. of F. Ritter & Co. 55
Kenbury Glass Works 66
Kessler Chemical Co., Inc. –
Kislak, J. I., Inc. –
Knapp Products, Inc. 36
Kohnstamm & Company –
Kolar Laboratories, Incorporated –
Lanaetex Products, Inc., The –
Lanitis Bros., Ltd. –
Lautier Fils, Inc. –
Leberco Laboratories 67
Lehmann, J. M. –
Leonhard Wax Co., T. 67
Lueders & Co., George –

Martinat, Dr. Jean Jacques 67
Maywood Chemical Works, Div. of The Stepan Chemical Co. –
Metal Fabrication Inc. 57
Miranol Chemical Co., The –
Monsanto Chemical Company –

Naarden –
Norda Essential Oil Co. Cover II
North Broad Labs 67
Noville Essential Oil Co., Inc., 62

Old Empire, Inc. –
Onyx Oil & Chemical Co. –
Frank Orlandi, Inc. –
Owen-Illinois Glass Co. –

Pace Incorporated –
Pacific Vegetable Oil Corp. –
Parento, Inc., Compagnie 2
Paris Cosmetics, Inc. 63
Parsons-Plymouth, Inc., M. W. –
Pathology Associates 67
Peerless Tube Co. –
Perry Bros., Inc. –
Penick & Co., S. B. –
Pennsylvania Refining Company –
P F W –
Polarome, Inc. –
Precision Valve Corp. –
Protean Chemical Corp. –
Publicker Industries, Inc. 11
Pylam Products, Inc. –

Reheis Co., Inc. 10
Rhodia, Inc. –
Richford Corp. 22
Risdon Manufacturing Co., The Cover IV
R.I.T.A. Chemical Corp. 21
Ritter & Co., F. 55
Robeco Chemicals, Inc. –
Robinson Wagner Co., Inc. –
Rona Laboratories, Inc. 58
Rose Oil Products Co. –
Roubechez, Inc. –
Roure-Dupont, Inc. –
Ruger Chemical Company, Inc. –

Schimmel & Co., Inc. –
Scovill Mfg. Co. –
The Sheffield Tube Corporation –
Shulton Inc., Fine Chemicals Div. Cover III
Snell, Foster D. 67
Stecker Chemicals, Inc. –
Sun-Lac, Inc. –
Stepan Chemical Co. –
Synfleur Scientific Labs, Inc. 60
Syntomatic Corp. –

Thomasson of Pa., Inc. –
Tombarel Products Corp. –

George Uhe Co., Inc. –
Ungerer & Co. –
Universal Outlet Co. –

Vanderbilt Co., R. T. 58
Van Dyk Company, Inc. 14
Verley & Company, Albert –
Verona Aromatics, A Div. of Verona-Pharma Chemical Corp. –
Voisin Restaurant 62

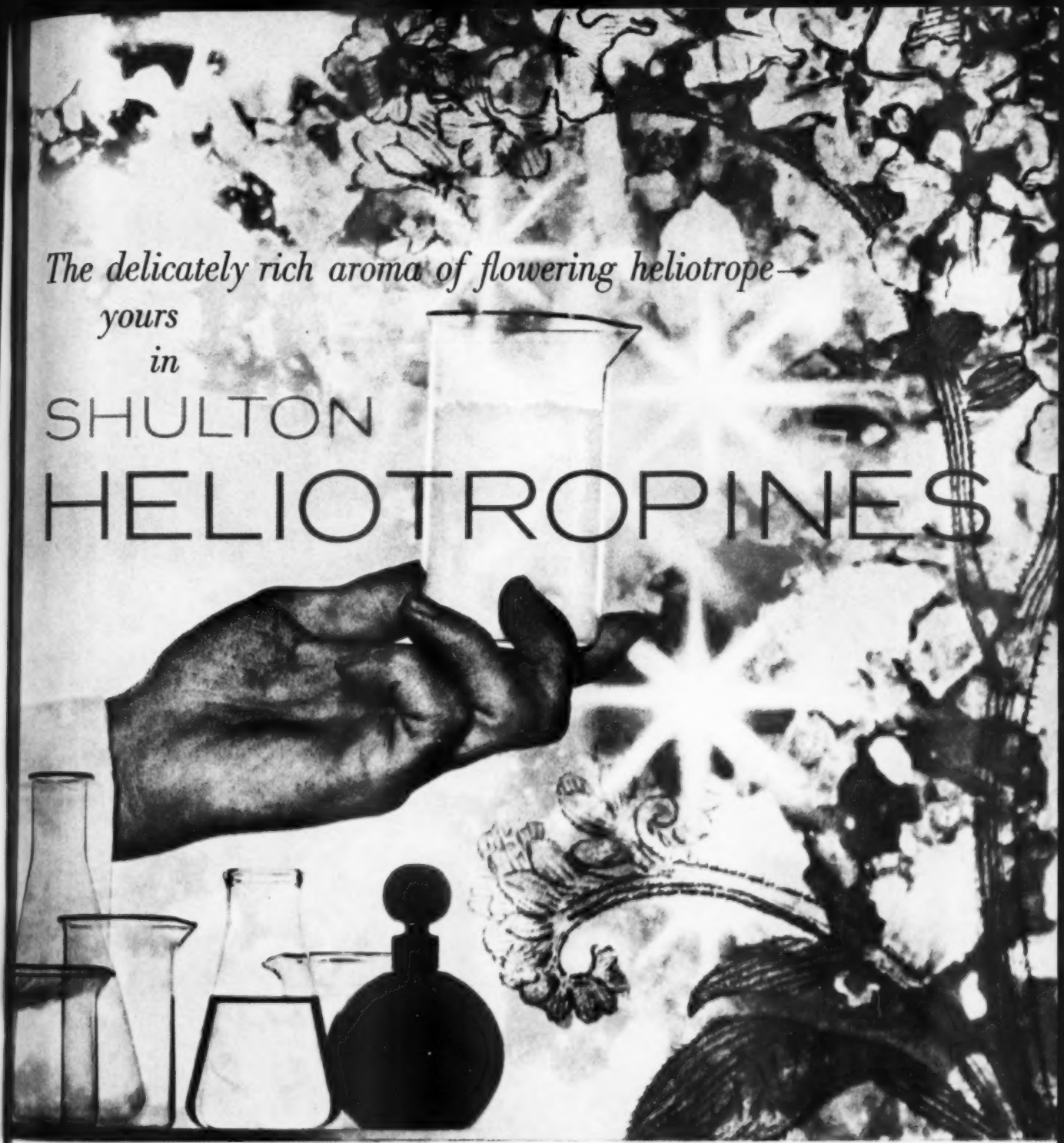
Webb & Co., Inc., R. D. 59
Whittaker, Clark & Daniels 59
John Wiley & Sons, Inc. –
Will & Baumer Candle Co., Inc. 55
Wilson–Martin –
Allen B. Wrisley Co. –

"MAXIMAROME"

"Naturals"

PLAZA 3-6070

CAMILLI, ALBERT & LALOUE, INC. 15 E. 48th St., New York



Recognized as an industry classic, SHULTON's famous "Helio" is universally popular for exceptional purity, uniformity and economy in use. It's an indispensable sweetening and fixative component in traditional lilac, sweet pea, lily-of-the-valley, heliotrope and other floral bouquets. Choose perfume or soap grade crystals for fine toiletries, technical grade for industrial uses. For information and samples, why not write today?

SHULTON FINE CHEMICALS Division of Shulton, Inc. ▪ 630 Fifth Ave., New York 20, N. Y. ▪ Circle 5-6263

Making good products better—through research

To Give Your Product New Sales-Allure

COMPLETE AEROSOL DISPENSERS *By*

RISDON

RISDON TINI-MIST

Non-refillable dispenser in glass or metal, equipped with metering valve

For Purse, Table or Travel . . . in a Variety of Beautiful Finishes . . . Equipped with Risdon Quality Valves to Insure Customer-Keeping Performance . . . Dispensing Perfumes, Pharmaceuticals and other products.

RISDON MINI-MIST®

Refillable, lipstick-size dispenser holds 250 to 300 metered sprays.

WI-120

RISDON VANITI-MIST®

Refillable container with metered or non-metered spray valves in one ounce and two ounce stock sizes.

For further information contact

THE RISDON MANUFACTURING CO.
AEROSOL DIVISION,
NAUGATUCK, CONN.
Branch Office: Chicago, Illinois